



University Avenue Master Plan from Euston Street to Belvedere Avenue

City of Charlottetown

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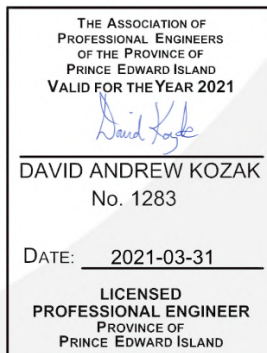


Table of Contents

1	Introduction	1
1.1	Objectives.....	1
1.2	Tasks.....	1
2	Data Collection, Field Observations & Review of Corridor	2
2.1	Vehicle Traffic Counts	2
2.1.1	Adjustment Factors.....	2
2.2	Average Daily Traffic	3
2.3	Transit Bus.....	3
2.3.1	Bus Stops, Signage and Lighting.....	3
2.3.2	Bus Shelters	4
2.4	Pedestrians.....	4
2.4.1	Counts.....	4
2.4.2	Sidewalks	5
2.4.3	Crossings	5
2.4.4	Pedestrian Access to Properties	6
2.5	Cyclists.....	6
2.6	Street Lighting.....	7
2.7	On-Street Parking.....	7
2.8	Driveways.....	7
2.9	Side Streets	7
2.10	Collisions	7
2.11	Other Observations.....	8
3	Traffic Operations of Existing Conditions.....	9
3.1	Methodology.....	9
3.2	Existing Operational Analyses.....	9
3.2.1	University Avenue at Belvedere Avenue	11
3.2.2	University Avenue at Nassau Street	11
3.2.3	University Avenue at Kirkwood Drive and Allen Street	12
3.2.4	Unsignalized Intersections South of Kirkwood Drive and Allen Street	12
3.2.5	University Avenue at Euston Street/ Great George Street	12
4	Intersection Improvements	13
4.1	Future Traffic Volumes.....	13
4.2	Roundabouts.....	13
4.3	Traffic Signals	13
4.4	Operational Analyses with Improvements.....	14
5	Corridor Improvements.....	16
5.1	Pedestrian Facilities	16

5.1.1	Wider Sidewalks.....	16
5.1.2	Boulevards/ Green Spaces.....	16
5.1.3	Pedestrian Crossings at Unsignalized Intersections.....	17
5.1.4	Street Lighting.....	17
5.1.5	Pedestrian Access to Businesses.....	18
5.2	Transit Bus.....	18
5.2.1	In-Lane Stops	18
5.2.2	Accessible Path	18
5.2.3	Lighting at Bus Stops.....	18
5.2.4	Signage.....	18
5.3	Bicycle Facilities	19
5.3.1	Multi-use Path	19
5.3.2	Bicycle Racks	19
5.3.3	Connecting to Other Bicycle Facilities	19
5.4	Right-of-Way	20
5.4.1	Consideration for Road Diet and Two-Way Left-Turn	20
5.4.2	Concept Plan.....	20
5.4.3	Typical Cross-Sections.....	20
5.4.4	Renderings	21
5.5	Driveways and Access Management.....	22
5.6	Reallocate On-Street Parking to Other Streets	22
5.7	Utilities	22
5.8	Signs	23
5.8.1	Street Name Signs.....	23
5.8.2	Commercial Signs.....	23
5.9	Existing Underground Infrastructure	23
6	Opinion of Probable Construction Costs	24
7	Conclusion.....	25
7.1	Recommendations	25
7.2	Key Considerations.....	25

Appendix 1 – Intersection Counts

Appendix 2 – Traffic Volumes Maps (Existing Conditions)

Appendix 3 – Synchro Reports – Existing Conditions

Appendix 4 – Synchro Reports – with Improvements

Appendix 5 – The Concept for University Avenue

Appendix 6 – Proposed Property Lines Drawings

Appendix 7 – Renderings of University Avenue

Appendix 8 – Opinion of Probable Costs

List of Tables

Table 1: Average Daily Traffic.....	3
Table 2: Level of Service Criteria for Intersections.....	9
Table 3: Operational Results for University Avenue Intersections – Noon Peak Hour Conditions	10
Table 4: Operational Results for University Avenue Intersections – PM Peak Hour Conditions.....	11
Table 5: Proposed Intersection Improvements.....	14
Table 6: Operational Results for University Avenue Intersections with Improvements	15
Table 7: Decision Support Tool – Pedestrian Crossing Treatment Selection Matrix	17
Table 8: Summary of Estimated Costs.....	24
Table 9: Summary of Recommendations	25

List of Figures

Figure 1: Study Area	1
Figure 2: Number of Pedestrians in a 6-hr Period (2020 Data)	5
Figure 3: Number of Reported Collisions on University Avenue from 2017 to 2019	8
Figure 4: Typical Cross Section– from Belvedere Avenue to Young Street	21
Figure 5: Typical Cross Section – from Young Street to Euston Street.....	21

1 Introduction

The City of Charlottetown retained EXP Services Inc. (EXP) to develop a master plan for future upgrades to University Avenue from Euston Street to Belvedere Avenue. The study area is shown in **Figure 1** below.



Figure 1: Study Area

1.1 Objectives

The objectives of the master plan were to:

- Improve safety along the corridor for all roadway users;
- Improve active transportation infrastructure;
- Improve aesthetics (e.g. providing more green space); and,
- Improve traffic flow.

1.2 Tasks

This project generally included the following tasks:

- Collect and review data (Section 2);
- Analyze traffic conditions (Section 3);
- Provide recommendations; complete with 2D concept plans, 3D renderings of key areas (Section 4 and 5); and,
- Provide a proposed construction sequencing and engineer's estimate (Section 6).

2 Data Collection, Field Observations & Review of Corridor

This section provides information about the data collection and corridor review of University Avenue from Euston Street to Belvedere Avenue. Field observations were conducted during daytime and nighttime hours in July 2020 in combination with a review of local aerial photography. The objective of the review was to assess aspects of the roadway that would affect all roadway users (i.e., vehicles, pedestrians, cyclists, trucks, etc.).

2.1 Vehicle Traffic Counts

Vehicle traffic counts were provided by the City for three (3) signalized intersections along the corridor:

- University Avenue at Belvedere Avenue (March 2017);
- University Avenue at Kirkwood Drive/ Allen Street (March 2017); and,
- University Avenue at Euston Street (January 2018).

Additional traffic counts were collected on July 14 and July 15, 2020, using Miovision camera technology. The counts were collected in 15-minute increments, for two hours during each morning, noon, and afternoon peak periods, respectively between 0700 and 0900, 1130 and 1330, and 1600 to 1800 hours. A total of 9 intersections were counted:

1. University Avenue at Nassau Street
2. University Avenue at Kirkwood Drive/ Allen Street
3. University Avenue at Eden Street
4. University Avenue at Summer Street
5. University Avenue at Pond Street
6. University Avenue at Gerald Street/ Lincoln Street
7. University Avenue at Connolly Street
8. University Avenue at Reserve Street
9. University Avenue at Bayfield Street/ Alley Street

2.1.1 Adjustment Factors

With the on-going restrictions due to Covid-19 pandemic, it was acknowledged that the traffic flows would not be completely returned to normal at the time of data collection. However, permanent traffic data counters at nearby roadways seem to indicate that most of the traffic in the afternoon hours had returned to near normal flow rates. By collecting an additional traffic count at the intersection of University Avenue at Kirkwood Drive/ Allen Street, it was resolved that the 2020 counts could be adjusted by comparing them with 2017 data.

In order to compare the counts, the March 2017 data was adjusted by a seasonal factor of 1.15 (to represent an average month of traffic flow) and then each turning movement at the intersection of University Avenue at Kirkwood Drive/ Allen Street were compared between 2020 and 2017 counts. A factor was averaged for each peak hour, as follows:

- AM Peak – 1.35
- Noon Peak – 1.08
- PM Peak – 1.16

These factors were used to adjust the July 2020 counts to represent typical flow rates. A traffic model was then created for the University Avenue corridor in order to evaluate the traffic flow conditions. The traffic operations are discussed in **Section 3**. The raw traffic counts are provided in **Appendix 1**.

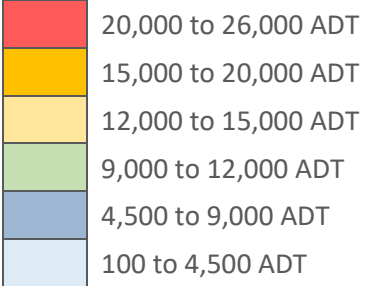
2.2 Average Daily Traffic

Based on the 6-hrs of collected traffic data at each intersection, an expansion factor of 2.35 was applied to the adjusted counts to represent a 24-hr count. The estimated Average Daily Traffic (ADT) on University Avenue varies between 14,400 veh/day and 25,500 veh/day. A summary of the ADT's is provided in the table below.

It is important to note the significant variation of ADT's along the University Avenue corridor. With this variation, it is anticipated that the cross-section of University Avenue dedicated to vehicle traffic will need to vary and concept plans will need to account for transitions from various cross-sections.

Table 1: Average Daily Traffic

No.	Intersecting Street	University Avenue Roadway Section			
		North	South	West	East
1	Belvedere Ave	25500	22700	13600	18500
2	Nassau St	21700	20300	3800	--
3	Kirkwood Dr/ Allen St	21000	17000	7900	14700
4	Eden St	17100	16800	2100	400
5	Summer St	16800	16100	1300	800
6	Pond St	16100	15200	2700	--
7	Lincoln/ Gerald	15100	13900	2000	1600
8	Connolly St	14000	13900	400	--
9	Reserve St	13800	13600	500	200
10	Bayfield St/ Alley St	13600	13300	400	400
11	Euston St	14400	10900	11400	11200



2.3 Transit Bus

Currently, there is one transit bus route, Route 1, on University Avenue. The transit bus route is generally a north/south route that travels from the Confederation Center on Grafton Street (Downtown) towards the north, to the Charlottetown Mall (at a transfer hub) and then back to the Confederation Center. There are no bus layby areas. In most cases, vehicles that are following behind the bus will either wait or change lanes if they don't want to wait for buses to pick up passengers along the route.

2.3.1 Bus Stops, Signage and Lighting

Within the Study Area, there are 8 bus stops for northbound passengers and 9 bus stops for southbound passengers. It is noted that one of the bus stops for northbound passengers is actually located on the west side of University Avenue, and requires the northbound bus to turn left into the parking lot of the GoodLife Fitness Center(455 University Avenue), pick up passengers waiting at the bus shelter, and proceed to turn left-out of the driveway, to continue heading north on University Avenue. It was noted by City staff that the left-turn movements for the bus are difficult to make since there are not many gaps in vehicle traffic flow during the peak hours.

The signage for bus stops does not appear to be well understood by motorists. It was observed on a few occasions that the vehicles almost rear-ended buses.

The area at the bus stops seemed to be very dark in the evening hours. Some improvements could be made to increase the visibility of passengers waiting for buses as the bus shelters do not currently have interior lights and there are not always overhead streetlights at each bus stop.

Several transit bus stops are noted to be very close to intersections. Over the next few years, whenever major roadway improvements are implemented, the placement of the transit bus stops should be reviewed with the transit authority (T3 Transit) and the engineering design team to confirm if the location should be moved away from the intersection.



Photo 1: Bus Stop Sign

2.3.2 Bus Shelters

There are seven (7) bus shelters. Most of them offer good accessibility for all users. However, there are three (3) locations that could be improved. The bus shelter at Dairy Queen (365 University Avenue) and the bus shelter at the Charlottetown Research and Development Centre (440 University Avenue, across from Tim Hortons) should have a hard surface constructed from the sidewalk to the curb, so that passengers do not have to cross over the landscaped area when entering and exiting the bus. Also, for the bus stop at the Sobeys (400 University Avenue), it would be preferred that the concrete steps be eliminated at this location; either the passengers' waiting area should be lowered or a ramp should be constructed so that wheel chair users or strollers can more easily board or disembark the bus. The steps do not currently provide an accessible path and may be difficult to plow in winter conditions. All the other bus stops appear to be accessible.



Photo 2: Bus Shelter at Sobeys (400 University Avenue)

2.4 Pedestrians

2.4.1 Counts

Counts of pedestrian activity were collected at the study intersections in July 2020. The following figure depicts the number of pedestrians counted at each intersection during the peak 6 hours of data (AM, Noon, and PM peaks). The area near the intersection of Lincoln Street/ Gerald Street appeared to have the most pedestrian activity at the time the data was collected.

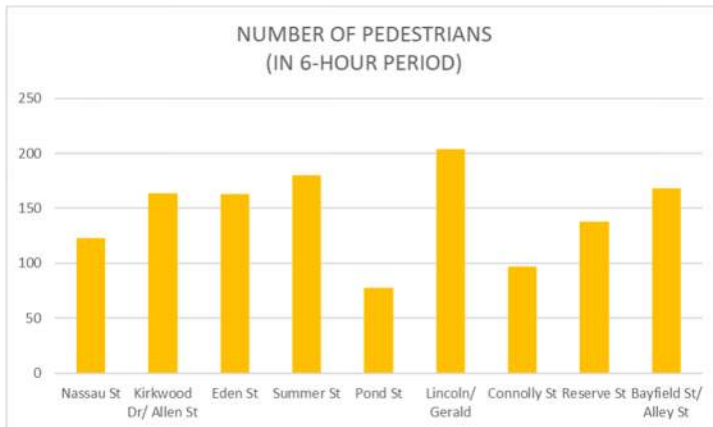


Figure 2: Number of Pedestrians in a 6-hr Period (2020 Data)

2.4.2 Sidewalks

Most of the corridor has sidewalks located on both sides of the roadway, with the exception of the east side of University Avenue, between Belvedere Avenue and Nassau Street. On this 400m-section, there are no sidewalks present.

Where there are sidewalks, the following items were noted:

- The sidewalk is narrow. The width varies from approximately 1.2m to 1.5m.
- In some locations, the sidewalk abuts the asphalt travel lanes (without a raised curb and gutter).
- In some locations, there is a landscaped area between the curb and the sidewalk.
- Sidewalks are sometimes discontinued through driveways, (e.g. McDonald’s driveway, Radio-Canada Driveway, Sobey’s, etc.).
- On private properties, where parking lots are adjacent to the sidewalk, vehicles sometimes park too close to the sidewalk and sometimes on the sidewalk. This creates a hazard not only for pedestrians but also for vehicles that are exiting driveways, as it impedes their sight lines.

2.4.3 Crossings

There are twelve (12) locations along the corridor where pedestrians have a marked crosswalk to cross University Avenue:

- Four (4) of these are at signalized intersections;
- Seven (7) pedestrian crossings are marked with ground-mounted signs and pavement markings only; and,
- One (1) pedestrian crossing has a both ground-mounted signs on each side of the roadway plus an overhead crosswalk sign, along with pavement markings (refer to photo below). It is noted that this overhead sign is not consistent with current guidelines from the Transportation Association of Canada (TAC) for pedestrian crossing treatments.



Photo 3: Marked Crosswalk with Overhead Illuminated Sign at University Avenue/ Gerald Street

On the southern section of University Avenue between Kirkwood Drive and Euston Street, the pedestrian crossings are more frequent and are located with a 65m to 190m-spacing. The spacing appears to be adequate for the southern section of University Avenue. However, there could be improvements made with regards to the signage and the type of crossing provided in order to conform to the latest *Pedestrian Crossing Control Guide from Transportation Association of Canada (TAC)*. It was also noted that at the University Avenue/ Bayfield Street pedestrian crossing there are a few missing pedestrian crossing signs and at the Douglas Street crossing, one of the pedestrian crossing signs is obscured by a utility pole.

On the northern section of University Avenue, between Kirkwood Drive and Belvedere Avenue, the pedestrian crossings are located only at the signalized intersection with a spacing of approximately 400m. This is quite long for pedestrian connectivity. As per the Transportation Association of Canada's *Pedestrian Crossing Control Guide*, it is suggested that distance between crossings be somewhere between 100m to 200m depending on the needs of the users, the road type, the traffic volumes, and pedestrian volumes.

2.4.4 Pedestrian Access to Properties

It was noticed that pedestrian access to the various retail stores and businesses often require pedestrians to make their way through busy parking lots. There should be designed areas (well-marked and maintained) for pedestrians to access the main store entrances.

2.5 Cyclists

Cyclists were not counted as part of the data collection program, however, a few cyclists were observed in the southern section of the study area (near Alley Street).

It is noted that there are no bike lanes on University Avenue within the Study Area, however, there are bike lanes just north of Belvedere Avenue and bike lanes on Belvedere Avenue. The City would like to consider implementing bicycle facilities for future improvements to the University Avenue corridor. This would provide an important link from the University to the Downtown core area.

Bicycle racks were observed at 335 University Avenue (RBC Royal Bank) and at 330 University Avenue (Outer Limit Sports). There may be others located along the corridor, but they were not readily noticed during our site visit.

2.6 Street Lighting

University Avenue is currently lit with luminaires from utility poles on both sides of the roadway, however, it is often staggered and does not appear to offer adequate lighting for pedestrians. In the section between Allen Street and Euston Street, many dark areas were observed as there was only street lighting on one side. Since this area has the most pedestrians, it should be the most lit up. In the section north of Allen Street, some of the ambient lighting came from parking lots and not necessarily from the street roadway.

2.7 On-Street Parking

On the west side of University Avenue, although there are no painted lines identifying on-street parking spaces, parking is presently permitted at the following addresses:

- 231, 241/243, 245, 249, 251, 261/263, 265, 269, 299, 307, 315, 327, 329 University Avenue

On-street parking is not permitted anywhere else along the corridor.

2.8 Driveways

There are some inconsistencies with driveways (accesses) provided for various properties along this corridor. With some of the larger properties, access locations appear to be well defined, have proper width, radii, and throat lengths. However, for smaller properties, access points are not well defined, are too wide, and do not provide adequate throat lengths. Also, the following safety concerns were noted:

- In some parking lots, drivers park their vehicles adjacent to the sidewalk. This makes it very difficult for drivers entering or exiting the site to see if the path is clear.
- It was observed that some vehicles leaving a property did so by backing out onto University Avenue. This should not be permitted on a busy roadway such as University Avenue.

2.9 Side Streets

Some of the side streets have restricted sight distances as a result of vegetation, utility poles, buildings, or signage. For example, at Reserve Street, the row of bushes along the Credit Union property should be removed and replaced with street trees or low-growth vegetation to ensure sight lines are not obscured. At Lincoln Street, the RBC sign should be either moved away from the intersection or replaced with a smaller sign on a post as it appears to be in the intersection sight triangle. It was also observed that some driveways on the corner lots may be too close to the intersection. Of concern is the parking on the north side of Nassau Street, which is too close to the signalized intersection.

The City is currently working on design plans to convert Passmore Street to a one-way street, in the westbound direction. This makes sense because it would provide a pairing with Bayfield Street which operates as a one-way in the eastbound direction.

It was observed for a few of the existing one-way streets, that the street name sign and One-way sign appear to be installed either too far back from University Avenue (e.g. at Connolly Street) or not on the same pole as the street name (e.g. at Bayfield Street). It would help for motorists' wayfinding if street name signs were placed a bit closer to University Avenue and have the one-way sign on the same pole.

2.10 Collisions

A review of available collision data was also performed to identify trends and risks, and to identify potential safety improvements to the roadway corridor. The City provided motor vehicle collision data that were tabulated for the years 2017 to 2019. A summary of collision locations is provided in **Figure 3**.

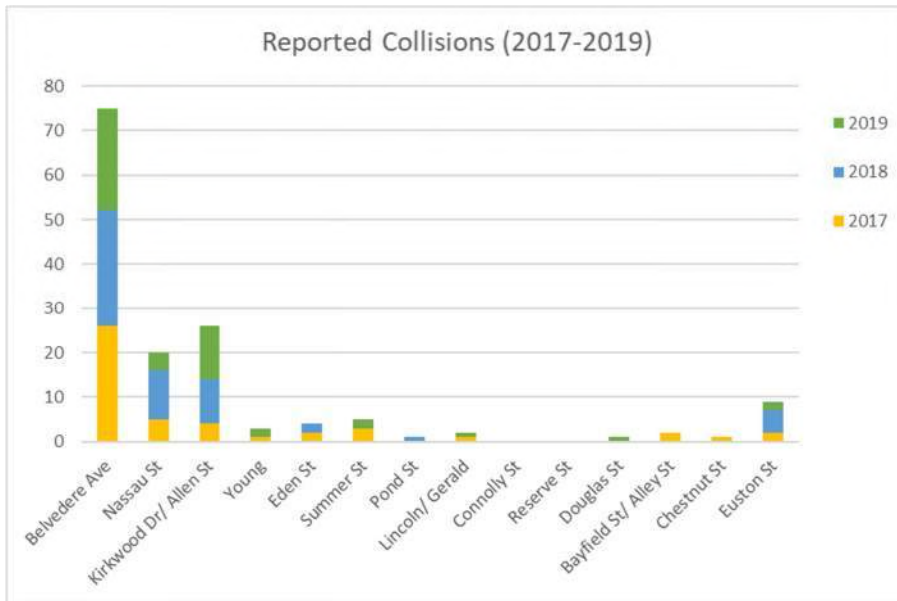


Figure 3: Number of Reported Collisions on University Avenue from 2017 to 2019

This shows that collisions appear to be more frequent at the intersection of University Avenue and Belvedere Avenue. The predominant collision configurations were rear-ends (29 collisions) and right-angles (23 collisions). The data did not always provide information on precise locations of collisions, but based on the description, it appears that quite a number of the collisions were related to motorists exiting from driveways.

2.11 Other Observations

- Lane widths vary throughout the corridor. Through lanes were measured with aerial photography to be between 3.2m to 4.5m wide. Turn lanes were measured to be between 3.0m to 3.3m-wide. It was noted that the northbound through lane, just north of Allen Street, has a very wide lane, until the Sobeys driveway, where dashed painted lines show two lanes. Some motorists were observed to be driving in the middle of the lane until they arrived at the painted lines and then chose a lane.
- With regards to posted speed, there is a 50km/h posted speed sign for northbound vehicle north of Allen Street (near the CBC-Radio-Canada building). There is a 40km/h posted speed sign for southbound vehicles near the Shoppers Drug Mart.
- There are many utility poles located in the asphalt section between sidewalk and travel lane. Since the edge of the travel lane is not clearly defined, the poles are considered as roadway hazards. A barrier curb could be used to better delineate the edge of travel lanes.
- There are also concrete bases for street lighting poles located near the edge of asphalt (near Belvedere Avenue) that are also considered as roadway hazards since there are no barriers preventing errant vehicles from hitting these structures.
- There are no stop signs at Indigo and Superstore entrances, but there are stop bars in place at these locations.
- Several traffic signal heads do not have reflective yellow backgrounds. These may be more difficult to distinguish at night.

3 Traffic Operations of Existing Conditions

Vehicle traffic conditions were evaluated on University Avenue using Synchro 11 traffic analysis software. The analysis was first conducted based on existing traffic volumes, road configuration, current traffic control and signal timings. The peak hours were analyzed during the noon and afternoon peak times. Since the morning peak hour volumes were found to be generally 20% lower than the noon and afternoon peak hours, it was determined that it was not necessary to analyze the morning peak hour.

The peak hour traffic volumes were inputted in the Synchro traffic model. A map view of each peak hour volumes (noon and afternoon) are provided in **Appendix 2**.

3.1 Methodology

Key measures used in the analysis of intersection operations included average vehicle delays, level of service (LOS), queues and volume to capacity (v/c) ratios. The standard LOS criteria for both signalized and stop sign-controlled intersections are shown in **Table 2**.

Table 2: Level of Service Criteria for Intersections

LOS	Signalized Intersections Control Delay (sec/veh)	LOS Description	Stop Controlled Intersections Control Delay (sec/veh)
A	less than 10.0	Very low delay; most vehicles do not stop (Excellent)	less than 10.0
B	between 10.0 and 20.0	Higher delay; more vehicles stop (Very Good)	between 10.0 and 15.0
C	between 20.0 and 35.0	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping (Good)	between 15.0 and 25.0
D	between 35.0 and 55.0	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (Satisfactory)	between 25.0 and 35.0
E	between 55.0 and 80.0	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of acceptable delay (Acceptable)	between 35.0 and 50.0
F	greater than 80.0	Considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (Unacceptable)	greater than 50.0

For the volume-to-capacity (v/c) ratio, it is typically considered acceptable if it is at or below 0.85 for through movements and 0.90 for turning lane groups. Some communities accept higher values.

The methodology from the Highway Control Manual (HCM) 6th edition was used in the evaluations of the unsignalized intersection, while the Synchro Control Delay (Percentile Method) was used for the signalized intersection.

3.2 Existing Operational Analyses

The results of the operational analysis for unsignalized and signalized intersections are summarized in **Tables 3 and 4** for Noon and PM peak hour conditions respectively. The detailed Synchro reports are provided in **Appendix 3** for reference.

The results show that in the Noon and PM peak hour, many intersections are operating with one or more lane group at poor LOS F and v/c ratios above the generally accepted thresholds. It is also noted that some of the vehicle queues at the signalized intersections are long and often impact adjacent driveways and minor street traffic flow. This is typically a disbenefit, however, in this case, it results in some drivers leaving a gap in traffic to allow minor

street traffic to enter and/or cross University Avenue. For example, although the model is showing that the Eden Street approach has a v/c of 2.0 and vehicle delays well above 300 secs, in reality, motorists are able to make their desired movements because there is a queue of vehicles on University Avenue.

A discussion on each intersection operation is provided below.

Table 3: Operational Results for University Avenue Intersections – Noon Peak Hour Conditions

No.	Intersection	Traffic Control	Overall LOS & Delay (sec/veh)	Criteria	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	University Ave at Belvedere Ave		57.8 E	V/C	0.80	1.08		0.81	1.07		0.42	0.79		0.72	0.77	
				Delay (s/veh)	44.9	108.9	Shared	45.2	103.1	Shared	24	41.8	Shared	35.9	39.1	Shared
				LOS	D	F		D	F		C	D		D	D	
				Queue (m)	88	#217		83	#194		20	107		54	125	
2	University Ave at Nassau St		12.8 B	V/C		0.64						0.54			0.58	
				Delay (s/veh)	Shared	31.2	Shared				Shared	10.2			10.4	Shared
				LOS		C						B			B	
				Queue (m)		48						58			81	
3	University Ave at Kirkwood Dr/ Allen St		44.0 D	V/C	0.28	0.93		0.74	0.47	0.44	0.13	0.91		0.92	0.76	
				Delay (s/veh)	28.5	82.1	Shared	42.6	45.3	7.9	12.5	50.6	Shared	61	31.1	Shared
				LOS	C	F		D	D	A	B	D		E	C	
				Queue (m)	27	#132		53	69	22	8	192		#107	200	
4	University Ave at Eden St			V/C		> 2.0			1.3		0.07			0.01		
				Delay (s/veh)	Shared	> 300	Shared	Shared	272.1	Shared	10.2	Free Flow		8.9	Free Flow	
				LOS		F			F		B		A			
5	University Ave at Summer St			V/C		0.58			0.28		0.03			0.02		
				Delay (s/veh)	Shared	62.8	Shared	Shared	32.1	Shared	9.3	Free Flow		9	Free Flow	
				LOS		F			D		A		A			
6	University Ave at Pond St			V/C		0.67					0.05					
				Delay (s/veh)	Shared	52.1	Shared				9.4	Free Flow			Free Flow	
				LOS		F				A						
7	University Ave at Lincoln St/ Gerald St			V/C		0.81			0.54		0.04			0.08		
				Delay (s/veh)	Shared	86.6	Shared	Shared	42.1	Shared	9.2	Free Flow		8.8	Free Flow	
				LOS		F			E		A		A			
8	University Ave at Connolly St			V/C	<i>One-way Street Westbound Direction</i>						0.02					
				Delay (s/veh)							0.4	Free Flow			Free Flow	
				LOS							A					
9	University Ave at Reserve St			V/C		0.13					0.01					
				Delay (s/veh)	Shared	20.7	Shared				8.9	Free Flow			Free Flow	
				LOS		C				A						
10	University Ave at Bayfield St/ Alley St			V/C					0.04		0.01			0.03		
				Delay (s/veh)				Shared	13.1	Shared	8.7	Free Flow		9	Free Flow	
				LOS					B		A		A			
11	University Ave at Euston Street		31.8 C	V/C	0.51	0.52		0.13	0.86		0.36	0.64	0.09	0.45	0.58	0.34
				Delay (s/veh)	22.7	29.4	Shared	17.3	49.3	Shared	20.4	39.3	0.4	21.8	36.2	10.1
				LOS	C	C		B	D		C	D	A	C	D	B
				Queue (m)	27	91		10	#149		24	92	0	33	84	20

95th Percentile volume exceeds capacity, queue may be longer.

Table 4: Operational Results for University Avenue Intersections – PM Peak Hour Conditions

No.	Intersection	Traffic Control	Overall LOS & Delay (sec/veh)	Criteria	Eastbound			Westbound			Northbound			Southbound		
					EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	University Ave at Belvedere Ave		76.8 E	V/C	0.86	0.97		0.86	1.41		0.35	0.82		0.87	0.65	
				Delay (s/veh)	55.6	89.9	Shared	54.7	235.9	Shared	21	44.3	Shared	58.9	33.9	Shared
				LOS	E	F		D	F		C	D		E	C	
				Queue (m)	#119	#186		#122	#286		22	140		#95	116	
2	University Ave at Nassau St		12.2 B	V/C		0.62						0.52			0.61	
				Delay (s/veh)	Shared	34.1	Shared				Shared	9.3			10.3	Shared
				LOS		C						A			B	
				Queue (m)		44						57			81	
3	University Ave at Kirkwood Dr/ Allen St		45.5 D	V/C	0.3	0.88		0.71	0.59	0.44	0.24	0.91		1.00	0.76	
				Delay (s/veh)	28.8	75.5	Shared	39.8	48.1	7.9	13.5	50	Shared	79.8	32.6	Shared
				LOS	C	E		D	D	A	B	D		E	C	
				Queue (m)	26	#131		60	87	21	11	#202		#124	188	
4	University Ave at Eden St			V/C		0.37					0.03		0.06		0	
				Delay (s/veh)	Shared	34.8	Shared	Shared	13.4	Shared	10.1	Free Flow	9	Free Flow		
				LOS		D		Shared	B	Shared	B		A			
5	University Ave at Summer St			V/C		0.76					0.31		0.02		0.05	
				Delay (s/veh)	Shared	97.6	Shared	Shared	32	Shared	9.5	Free Flow	9.1	Free Flow		
				LOS		F		Shared	D	Shared	A		A			
6	University Ave at Pond St			V/C		0.84						0.06				
				Delay (s/veh)	Shared	81.3	Shared				9.6	Free Flow		Free Flow		
				LOS		F					A					
7	University Ave at Lincoln St/ Gerald St			V/C		1.05			0.6			0.07		0.09		
				Delay (s/veh)	Shared	161.1	Shared	Shared	41.1	Shared	9.3	Free Flow	9.1	Free Flow		
				LOS		F		Shared	E	Shared	A		A			
8	University Ave at Connolly St			V/C	<i>One-way Street Westbound Direction</i>						0.01				Free Flow	
				Delay (s/veh)							0.3	Free Flow			Free Flow	
				LOS							A					
9	University Ave at Reserve St			V/C		0.16						0.01				
				Delay (s/veh)	Shared	21	Shared				9	Free Flow			Free Flow	
				LOS		C					A					
10	University Ave at Bayfield St/ Alley St			V/C					0.04			0.02		0.02		
				Delay (s/veh)				Shared	12.8	Shared	8.7	Free Flow	8.9	Free Flow		
				LOS					B	Shared	A		A			
11	University Ave at Euston Street		34.4 C	V/C	0.48	0.76		0.23	0.84		0.46	0.77	0.22	0.57	0.64	0.28
				Delay (s/veh)	24.5	41.2	Shared	20.8	49.8	Shared	20.6	43.3	6.2	23.4	37	11.5
				LOS	C	D		C	D		C	D	A	C	D	B
				Queue (m)	38	#130		14	#129		30	119	11	31	98	24

95th Percentile volume exceeds capacity, queue may be longer.

3.2.1 University Avenue at Belvedere Avenue

The intersection with the highest overall delay appears to be the University Avenue at Belvedere Avenue intersection. However, the major through lanes (northbound/ southbound) appear to be operating with satisfactory level-of-service LOS D, while the side street (Belvedere Avenue) has poor LOS F. This indicates that there is an imbalance in the amount of green time attributed to the northbound/ southbound direction versus the eastbound/ westbound direction. Additional green time could be allotted to the Belvedere Avenue approaches, in order to improve the LOS for EB/WB approaches. However, the University Avenue NB and SB directions would experience increases in vehicle delays and LOS would change from LOS D to LOS E, depending how much green time is reallocated. The Belvedere Avenue would still operate with LOS F and so additional improvements would be recommended to achieve a minimum LOS E for all approaches. These improvements are discussed further in Section 4.

3.2.2 University Avenue at Nassau Street

The intersection at University Avenue/ Nassau Street appears to be operating with good to very good LOS C and B. However, there were a few collisions noted at this intersection, and so there are some potential safety

improvements that could be implemented, such as providing an exclusive left-turn lane on University Avenue. These improvements are discussed further in Section 4.

3.2.3 University Avenue at Kirkwood Drive and Allen Street

The intersection at University Avenue/ Kirkwood Drive and Allen Street appears to have an overall satisfactory LOS D. However, there are some lane groups operating with poor LOS F and above the v/c thresholds, which indicates that additional capacity may be needed to address current traffic flow demand. It was also observed during the data collection that there may be some vehicle queues on Allen Street (in the westbound direction), as a result of the signalized intersection with the Sobey's Driveway. This intersection was not included as part of University Avenue Master Plan, but should be evaluated in more detail to ensure traffic does not spill back to University Avenue.

3.2.4 Unsignalized Intersections South of Kirkwood Drive and Allen Street

The intersections south of Kirkwood Drive and Allen Street are mostly unsignalized intersections, with many of the minor street approaches operating with poor LOS F and v/c ratios above 1.0 for a few intersections. The intersections of University Avenue and Reserve Street and University Avenue/ Bayfield Street/ Alley Street appear to be operating with acceptable LOS C, however it is noted that Bayfield Street and Alley Street are offset from one another which can lead to potential issues for left-turning vehicles. Since these vehicle demands are currently low (< 15 veh/hr), it does not appear to be a major issue at this time.

3.2.5 University Avenue at Euston Street/ Great George Street

The intersection at University Avenue and Euston Street appears to be operating well with good LOS C in the noon and PM peak hour. However, there are higher v/c ratios and longer vehicle queues for the Euston Street approaches (eastbound/ westbound direction). With signal timing optimization and a shorter cycle length, the queues could be reduced.

4 Intersection Improvements

4.1 Future Traffic Volumes

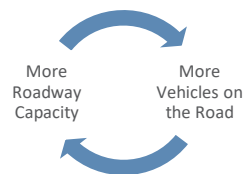
In an effort to provide a sustainable approach to managing growth on University Avenue, it is suggested that roadway improvements be made to address existing traffic volumes and that more infrastructure be built to accommodate pedestrians, cyclists and transit. This will help to develop a more complete street by planning for all roadway users.

It is recognized that University Avenue is a major commercial corridor, a truck route, and a key transportation link to the downtown area of the City of Charlottetown. As such, making improvements to address existing traffic congestion is important, however, if too much roadway capacity is added to the network, then more vehicles will continue to be on the roadway. If, on the other hand, more investments are made to support transit, cyclists and pedestrians, then more people could be persuaded that there are better and more efficient ways to get to their destinations.

Since the majority of land parcels on this corridor are fully developed, it is recommended that roadway improvements be made to address existing traffic congestion and that no growth rate be used to projected future increases in traffic volumes.

The analyses for future traffic conditions were therefore completed based on existing traffic volumes with proposed improvements.

The objectives of the roadway improvements were to improve traffic flow, reduce vehicle delays, improve level-of-service, improve safety of the corridor, and to optimize intersection operations.



4.2 Roundabouts

With regards to intersection operations, single-lane roundabouts offer many advantages with regards to slowing down vehicle speeds, reducing the severity of collisions, and improving traffic flow (depending on turning volumes of each approach). The potential for roundabout retrofits was considered for all four (4) signalized intersections. The traffic operations were reviewed using the Sidra software, to see if single lane roundabouts could be implemented. **The results found that, as a single-lane roundabout, all four intersections would operate with LOS F.**

If roundabouts were to be given further consideration, they would need to be multi-lane roundabouts in order to operate with acceptable LOS. It is noted that a multi-lane roundabout would result in a larger inscribed circle diameter (ICD), which would result in larger land requirements, and require closing a number of driveways within the functional area and could result in detrimental impacts to smaller businesses near the roundabout. It is also noted, that while single lane roundabouts do offer some safety benefits with regards to vehicle collisions, the multi-lane roundabouts can be more difficult to cross for pedestrians and cyclists, as motorists in both lanes do not always see/yield to pedestrians. In some cases, additional pedestrian crossing infrastructure (i.e. Rectangular Rapid Flashing Beacons) are needed to make motorists aware of pedestrians. This also relies on pedestrians and cyclists' compliance in activating the RRFB. For these reasons, it was decided to not pursue the multi-lane roundabout option, but to improve the traffic signal infrastructure.

4.3 Traffic Signals

Improvements along the corridor, with the use of traffic signals and lane configuration changes, were considered at various intersections. The proposed improvements at the intersections are described in **Table 5**.

Table 5: Proposed Intersection Improvements

Intersection	Description
University Avenue at Belvedere Avenue	<ul style="list-style-type: none"> • Add right-turn lanes (northbound, southbound, and westbound directions) • Provide a narrow median barrier on the University Avenue southbound approach to eliminate left-turn movements into and out of driveways • Provide better alignment for Belvedere Avenue (westbound and eastbound) approaches • Provide coordinated traffic signals with new signals at Indigo driveway • Reduce cycle length from 142 secs to 90 secs • Optimize signal timing plan • Upgrade signal heads to have reflective yellow backgrounds
University Avenue at Indigo Driveway	<ul style="list-style-type: none"> • Provide new coordinated traffic signals • Provide new driveway for RCMP and close the existing driveway • Provide sidewalk on the east side of University Avenue and a new bus stop
University Avenue at Nassau Street	<ul style="list-style-type: none"> • Widen University Avenue to provide exclusive left-turn lane for northbound direction • Upgrade traffic signals to provide protected left-turn phase • Optimize traffic signal timing • Provide additional pedestrian crossing on University Avenue (on the southside of the intersection)
University Avenue at Kirkwood Drive/ Allen Street	<ul style="list-style-type: none"> • Add a shared through right-turn lane for the northbound direction • Add a right-turn lane in the southbound direction • Provide better alignment for westbound and eastbound approaches • Reduce cycle length from 128 secs to 80 secs
University Avenue at Pond Street	<ul style="list-style-type: none"> • Provide new traffic signals • Add a right-turn lane in the southbound direction • Provide two lanes (right-turn and left-turn) on the Pond Street approach
University Avenue at Euston Street/ Great George Street	<ul style="list-style-type: none"> • Provide better alignment for northbound and southbound approaches • Optimize signal timing and reduce cycle length from 115 secs to 85 secs

4.4 Operational Analyses with Improvements

The traffic operations for each intersection were analyzed with Synchro software. The results are summarized in **Table 6** for the noon and PM peak hour. The detailed Synchro reports are provided in **Appendix 4**.

The results show that most of the intersections are projected to operate with good to satisfactory levels-of-service (LOS C to D). It is noted that there is one lane group, in the noon peak hour, that is projected to have LOS E for a minor approach movement. This is for the Kirkwood Avenue eastbound (EB) approach. The LOS E is still considered an acceptable LOS for a peak hour condition.

It is also noted that a few lane groups are projected to be nearing capacity with v/c ratios above 0.85. For these intersections, it is recommended that traffic volumes be monitored on a regular basis so that signal timing plans can be optimized seasonally and adjusted to continue to offer overall acceptable levels-of-service.

Table 6: Operational Results for University Avenue Intersections with Improvements

Intersection	Peak Hour	Traffic Control	Overall LOS & Delay (sec/veh)	Criteria	Directional Performance															
					EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
University Avenue at Belvedere Avenue	Noon Peak		32.0 C	V/C	0.63	0.91		0.88	0.60	0.29	0.42	0.68	0.46	0.74	0.70	0.33				
				Delay (s/veh)	19.9	53.4	Shared	45.1	32	7.8	22.4	32.5	9.7	38	34.3	10.4				
				LOS	B	D		D	C	A	C	C	A	D	C	B				
	Queue (m)		45	#125		#60	63	17	14	37	8	#47	#82	15						
	PM Peak		32.7 C	V/C	0.81	0.87		0.92	0.70	0.46	0.32	0.78	0.37	0.87	0.57	0.31				
				Delay (s/veh)	34.7	52.3	Shared	52.4	39.4	11.2	13.9	31.1	6.5	49.5	27.4	9.5				
LOS		C		D		D	D	B	B	C	A	D	C	A						
Queue (m)	#54	#104		#83	75	24	8	32	10	#70	70	22								
University Avenue at Indigo Driveway	Noon Peak		7.7 A	V/C	0.52	0.07		0.03	0.01		0.29	0.27		0.01	0.43					
				Delay (s/veh)	47.1	0.4		32.4	0	Shared	4.8	5	Shared	3.4	6.5	Shared				
				LOS	D	A		C	A		A	A		A	A					
	Queue (m)		27	0		4	0		11	44		m0	m34							
	PM Peak		9.1 A	V/C	0.57	0.06		0.03	0.01		0.27	0.35		0.01	0.43					
				Delay (s/veh)	47.6	0.2	Shared	31.2	0	Shared	7.8	7.1	Shared	7.2	7.3	Shared				
LOS		D		A		C	A		A	A		A	A							
Queue (m)	31	0		4	0		18	70		m1	m32									
University Avenue at Nassau Street	Noon Peak		13.6 B	V/C	0.48		0.27				0.23	0.41			0.73					
				Delay (s/veh)	27.7		7.8				6.7	7.4			17.6	Shared				
				LOS	C		A				A	A			B					
	Queue (m)		28		7				4	38			#109							
	PM Peak		12.7 B	V/C	0.48		0.18				0.17	0.37				0.67				
				Delay (s/veh)	27.9		8				6	6.4			16.2	Shared				
LOS		C			A				A	A			B							
Queue (m)	29		8				5	40			#115									
University Avenue at Kirkwood Avenue/Allen Street	Noon Peak		29.5 C	V/C	0.3	0.84		0.73	0.39	0.4	0.14	0.66		0.68	0.76	0.12				
				Delay (s/veh)	23.3	56.8	Shared	37	31.9	6.3	13.1	31	Shared	21.4	30.3	0.5				
				LOS	C	E		D	C	A	B	C		C	C	A				
	Queue (m)		22	#96		43	53	18	7	71		46	#144	1						
	PM Peak		28.2 C	V/C	0.30	0.78		0.81	0.58	0.44	0.24	0.58		0.76	0.76	0.13				
				Delay (s/veh)	21.1	46.8	Shared	45.9	36	7	12.4	24.5	Shared	26.1	29.8	1.7				
LOS		C		D		D	D	A	B	C		C	C	A						
Queue (m)	19	#81		#57	64	18	9	61		57	125	1								
University Avenue at Pond Street	Noon Peak		11.7 B	V/C	0.64	0.21					0.05	0.48			0.49	0.15				
				Delay (s/veh)	51.7	11.5	Shared				3.6	6.6			9.7	3.7				
				LOS	D	B					A	A			A	A				
	Queue (m)		40	9					3	72			96	10						
	PM Peak		12.5 B	V/C	0.46		0.17				0.12	0.55				0.55	0.13			
				Delay (s/veh)	22.2		6.7				4.9	9.1			15.9	5.5				
LOS		C			A				A	A			B	A						
Queue (m)	26		6				4	68			#113	9								
University Avenue at Euston Street	Noon Peak		27.8 C	V/C	0.64	0.56		0.14	0.89		0.35	0.57	0.08	0.43	0.52	0.30				
				Delay (s/veh)	60	27.3	Shared	15.5	47.9	Shared	16.3	29.3	0.3	17.6	27.2	4.9				
				LOS	C	C		B	D		B	C	A	B	C	A				
	Queue (m)		22	74		8	#112		20	71	0	26	64	11						
	PM Peak		29.1 C	V/C	0.53	0.81		0.24	0.81		0.51	0.73	0.21	0.63	0.63	0.26				
				Delay (s/veh)	23.2	40.1	Shared	16.9	39	Shared	19.7	33.9	3.5	25.4	29.9	5				
LOS		C		D		B	D		B	C	A	C	C	A						
Queue (m)	22	#113		11	#94		24	89	7	24	74	12								

95th Percentile volume exceeds capacity, queue may be longer.
 m Metered Queue

5 Corridor Improvements

The objectives of the project were to make improvements to active transportation, roadway aesthetics, and safety for all roadway users. This section provides suggested improvements to address these remaining aspects of the University Avenue Master Plan.

5.1 Pedestrian Facilities

Since it is intended that improvements be made to support active transportation, enhancement of pedestrian facilities should be a priority.

5.1.1 Wider Sidewalks

Wherever possible, especially where there is higher number of pedestrians, wider sidewalks should be prioritized. A 1.8m-wide sidewalk would be desirable along arterial roadways, to allow greater mobility of pedestrians. However, understanding that this may not be feasible due to limitations of right-of-way and proximity of buildings to the right-of-way, in certain sections of University Avenue, the sidewalk could be narrowed to 1.5m wide.

5.1.2 Boulevards/ Green Spaces

A boulevard should be provided to separate the vehicle travel lanes and pedestrians, as well as pedestrians from parking lots. The space could be used to accommodate street trees, light posts, garbage bins, bicycle racks, hydrants and other utilities. Where right-of-way space is limited, specific landscaping solutions could be considered such as tree cells, large containers for flowers, or other low growth vegetation. Where possible, opportunities to improve stormwater management along the corridor (e.g. bioswales, rain gardens) should also be considered.

With regards to separation between the parking lot and sidewalk, the space should be adequate to suit either vegetation or a short decorative fence. See photo below. This type of treatment helps separate pedestrians from parked vehicles and better defines the location of driveways.



Photo 4: Example of Parking Lot Screening with Short Decorative Fence and Vegetation

Based on input from the City with regards to current practices, it would be preferred to have minimum boulevard width of 1.5m for low growth vegetation and 3.0m for street trees. At locations where the 1.5m width cannot be achieved, due to proximity of buildings or other constraints, it is suggested that it could be reduced slightly in order to still provide a separation between pedestrians and vehicles.

The type of desired landscaping elements to be provided through-out the corridor should be designed by a landscape architect. The final dimensions of right-of-way space allocated to boulevards and green space should be determined during the detailed design phase. The City may want to consider planting additional street trees on properties that have a large frontage onto University Avenue.

5.1.3 Pedestrian Crossings at Unsignalized Intersections

There are currently eight (8) pedestrian crossings at unsignalized intersections. However, since there are proposed improvements to install traffic signals at Pond Street, the pedestrian crossings remaining (at unsignalized intersections) would be seven (7). Based on the latest TAC guidelines, it was found that these pedestrian crossings could be improved in order to enhance mobility and safety of pedestrians. The *Pedestrian Crossing Control Guide* provides a treatment selection matrix for selecting the type of pedestrian crossing treatment based on average daily traffic (ADT), speed limit and pedestrian crossing distance. Refer to **Table 7**.

Table 7: Decision Support Tool – Pedestrian Crossing Treatment Selection Matrix

Average Daily Traffic	Speed Limit ² (km/h)	Total Number of Lanes ¹				
		1 or 2 lanes	3 lanes (two-way)	3 lanes (one-way)	2 or 3 lanes/direction w/ raised refuge	2 lanes/direction w/o raised refuge
1,500 < ADT ≤ 4,500	≤ 50	GM	GM	GM	GM	GM+
	60	GM+	GM+	OF	RRFB or OF ³	RRFB
	70	RRFB	RRFB	OF	OF	OF
4,500 < ADT ≤ 9,000	≤ 50	GM	GM	GM	GM	RRFB
	60	GM+	GM+	OF	RRFB or OF ³	OF
	70	RRFB	OF	OF	OF	TS
9,000 < ADT ≤ 12,000	≤ 50	GM	RRFB	OF	RRFB or OF ³	OF
	60	RRFB	RRFB	OF	RRFB or OF ³	TS
	70	OF	OF	OF	TS	TS
12,000 < ADT ≤ 15,000	≤ 50	RRFB	RRFB	OF	RRFB or OF ³	OF
	60	RRFB	OF	OF	RRFB or OF ³	TS
	70	OF	TS	TS	TS	TS
> 15,000	≤ 50	RRFB	OF	OF	RRFB or OF ³	TS
	60	RRFB	TS	TS	TS	TS
	70	OF	TS	TS	TS	TS

Abbreviations: GM/GM+: Ground-Mounted/ Ground-Mounted (Plus), RRFB: Rectangular-Rapid-Flashing-Beacons, OF: Overhead Flashing, TS: Traffic Signals

Although the pedestrian crossings are not all the same length, some are 3 lanes (e.g. at Summer Street) and some are 2 lanes (e.g. at Reserve Street), based on the matrix presented above, for speed limit of 50km/h and ADT between 12,000 and 15,000, the Rectangular Rapid Flashing Beacons (RRFB) would be the suggested treatment for the pedestrian crossings at unsignalized intersections. It is therefore recommended that this pedestrian crossing control treatment be considered at strategic locations as part of the corridor improvements.

Once the Covid-19 pandemic is over (or things return to a more normal state), it is recommended that pedestrian counts be completed at all seven (7) crossings to determine which pedestrian crossing is warranted and if any could be removed or relocated to more strategic locations. In order to evaluate these crossings, it is recommended that counts be done when schools and universities are open and data be collected for a 12-hour period.

5.1.4 Street Lighting

It is recommended that improvements be made to the overall lighting along the corridor for all roadway user (vehicles, transit users, pedestrians and cyclists). It is recommended that pedestrian-level lighting be incorporated into the detailed design phase of University Avenue to enhance pedestrian and cyclist’s safety, not only at intersections but throughout the corridor to provide continuity and cohesiveness. Lighting should be considered not only from the motorist’s point of view but also from the pedestrian’s. Placing lighting at proper heights, so it illuminates the faces of people using the space, is recommended to enhance the safety and security of pedestrians and improve the vibrancy of the street corridor.

As a next step to this report, it is recommended that the City engage a landscape architect to help with developing an overall concept (i.e. ‘feeling’) for the aesthetic elements of the corridor. This would enable a consistent

selection of such items as the type of street lighting poles and luminaires to be used along the corridor, street hardware, etc. This task should be coordinated with City during the detail design phase, as it was expressed that there is a desire to enhance the heritage ‘feeling’ of the corridor. Such street lighting could be similar to what is currently on Great George Street or another approach to lighting fixtures could be used on the corridor altogether.

5.1.5 Pedestrian Access to Businesses

It is recommended that pedestrian routes from the sidewalk to businesses be improved with either dedicated walkways or painted asphalt space. This will help improve the visibility of pedestrians and reduce conflicts with vehicles.

5.2 Transit Bus

With regards to improvements to the transit system, a few recommendations are provided below to help improve transit service along the University Avenue corridor.

5.2.1 In-Lane Stops

The current transit bus stops along the corridor are in-lane stops. It is recommended that these be kept as-is to ensure the efficiency of the bus route, since merging into or re-entering the flow of general traffic after a conventional curbside pull-out is a source of delay for the transit system. The layby areas could be considered at locations where buses have longer dwell times due to number of passengers boarding or disembarking, but at this time, the in-lane stops are the preferred operation.

5.2.2 Accessible Path

All bus stop locations should have hard surfaces for waiting passengers and for passengers boarding and disembarking the bus. There are locations that could be improved with regards to accessible paths for transit passengers:

- The bus shelter at Dairy Queen (365 University Avenue) and the bus shelter at the Charlottetown Research and Development Centre (440 University Avenue, across from Tim Hortons) should have a hard surface constructed from the sidewalk to the curb, so that passengers do not have to cross over the landscaped area when entering and exiting the bus.
- Also, at the bus stop at the Sobeys (400 University Avenue), it would be preferred that the concrete steps be eliminated at this location; either the passengers’ waiting area should be lowered or a ramp should be constructed so that wheelchair users or strollers can more easily board or disembark the bus. The steps do not currently provide an accessible path and are difficult to maintain in winter conditions.

5.2.3 Lighting at Bus Stops

It is recommended that lighting be improved at bus stops and bus shelters, so that passengers waiting for the bus can be seen by transit bus drivers. These could be accomplished with either luminaires on streetlight poles, or with internal bus shelter lighting.

5.2.4 Signage

The signage for bus stops does not appear to be well understood by motorists. It was observed on a few occasions that the vehicles almost rear-ended buses at bus stops. It is recommended that signage using the bus symbols (shown below) be considered at bus stops. It is believed that this sign may be more easily understood by motorists that do not use the transit system.



Photo 5: Bus Stop Sign

5.3 Bicycle Facilities

5.3.1 Multi-use Path

There are several types of bicycle facilities that could be constructed for this corridor (e.g. bike lane, cycle track, multi-use path). In order to select the appropriate type of bicycle facility, several factors were considered, including daily traffic volumes, vehicle speeds, heavy trucks, acquisition of right-of-way, provision of adequate separation from vehicles (to accommodate all types of cyclists), and having a surface that can be maintained year-round.

The multi-use path was selected as the preferred solution to accommodate cyclists on the University Avenue corridor. One of the advantages of a multi-use path is that it requires less right-of-way than “on-street” bike lanes as it allows cyclists and pedestrians to share space. The multi-use path also provides physical separation from vehicles, which allows a wider range of cyclists to feel more comfortable using the bicycle facility. One of the disadvantages of having a shared space for pedestrians and cyclists is the increased risk of collisions between cyclists that are going too fast and pedestrians and/or vehicles at driveways and side-streets. The introduction of a separated multi-use path along the entire length of the corridor has potential to attract recreational and commuter cyclists from a large catchment area with the promise of traveling along this section of the University Avenue corridor on a scenic, safe, continuous, family-friendly path. Additional signage and pavement markings should be considered (at the detailed design phase) to ensure that measures are put in place to provide safe crossings at these conflict points. Since there is a lower number of driveways on the east side, it was determined that it would be best if the multi-use path was on the east side.

5.3.2 Bicycle Racks

In order to continue encouraging the use of bicycles as a means of transportation, it would be beneficial to have more bicycle racks available on University Avenue. It is therefore recommended that the City:

- Continues to promote their bicycle rack cost sharing program to businesses with a focus on the University Avenue merchants; and,
- Considers incorporating changes to the City zoning by-laws to require new developments to provide a minimum number of bicycle parking based on size of their development.



Photo 6: Example of a Bicycle Rack at Farm Centre

5.3.3 Connecting to Other Bicycle Facilities

In order to continue promoting active transportation throughout the City, providing connections to other cycling facilities will be an important aspect for the success of the transportation network. It is recommended that the City consider the continuation of a multi-use path on:

- University Avenue (between Belvedere Avenue and Brown Court/ UPEI);

- Belvedere Avenue (between University Avenue and the Confederation Trail);
- Connection to Ravenwood Drive West (at the Charlottetown Research and Development Centre) to provide a link to the Confederation Trail; and,
- Allen Street (between University Avenue and the Confederation Trail).

5.4 Right-of-Way

5.4.1 Consideration for Road Diet and Two-Way Left-Turn

In effort to reassign valuable right-of-way space to pedestrians and cyclists, four-lane roadways can sometimes be converted to three-lane roadways, with a center two-way left-turn lane. The University Avenue corridor has a 4-lane cross-section from Belvedere Avenue to Kirkwood Drive/ Allen Street (approximately 800m). However, there is currently less demand for left-turning vehicle traffic in the southbound direction compared to the northbound direction. Since the land use on the west side of the roadway is generally retail and restaurants, it has more vehicle trips entering/ exiting from driveways, than the east side. It is expected that the majority of traffic that would use the left-turn lane would be northbound traffic. If the two-way left-turn lane were implemented, it is believed that motorists would get accustomed to the lack of opposing left-turning traffic and would use the center left-turn lane as a passing lane or a very long left-turn lane. For the southbound lane, if it were changed to a single lane (compared to the current two-lanes), it is expected that there would be longer vehicle queues in the peak hour, as vehicles in a single file would be slowed down whenever a vehicle turned right (into a driveway) and/ or was stopped behind the transit bus. Based on the noon and pm peak hour volumes generally being over 800 veh/hr, the level-of-service for vehicle traffic would be significantly reduced if the two through lanes were reduced to one lane in each direction. For these reasons, the two-way left-turn lane **was not given further consideration**.

5.4.2 Concept Plan

A concept plan was prepared that shows the proposed improvements and various cross-sectional elements discussed in **Sections 5.1 to 5.3**. It is noted that this concept was drawn based on aerial imagery and the final location of proposed right-of-way limits should be determined during the preliminary design phase with appropriate topographic and legal survey. The concept plan is provided in **Appendix 5**.

In order to implement the proposed corridor improvements, additional right-of-way would be needed. The proposed property lines were drawn based on the assumption that 1.0m of right-of-way would be acquired behind the sidewalk and the multi-use path. If buildings were an issue, the proposed property line was drawn at an offset of 0.5m instead. These reduced right-of-way locations are generally for the civics' 249, 245, 228/230/232, 222, 223, 219, 218. The drawings with the proposed property lines are provided in **Appendix 6**.

5.4.3 Typical Cross-Sections

Two (2) typical cross-sections were also developed; in order to depict some of the widths that are used along the corridor. These are presented in **Figure 4** and **Figure 5** below.

Figure 4 shows the landscaped boulevard area between the multi-use path and the curb proposed to be 3.0m, while the landscaped boulevard area between the sidewalk and curb is 1.5m. Travel lanes are generally 3.5m-wide. Although it is not specifically shown in the cross-section, any lanes along the corridor that are specifically for left-turning movements were drawn, on the concept plan, as 3.3m-wide lanes. This cross-section was generally used along the corridor from Belvedere Avenue to Young Street.

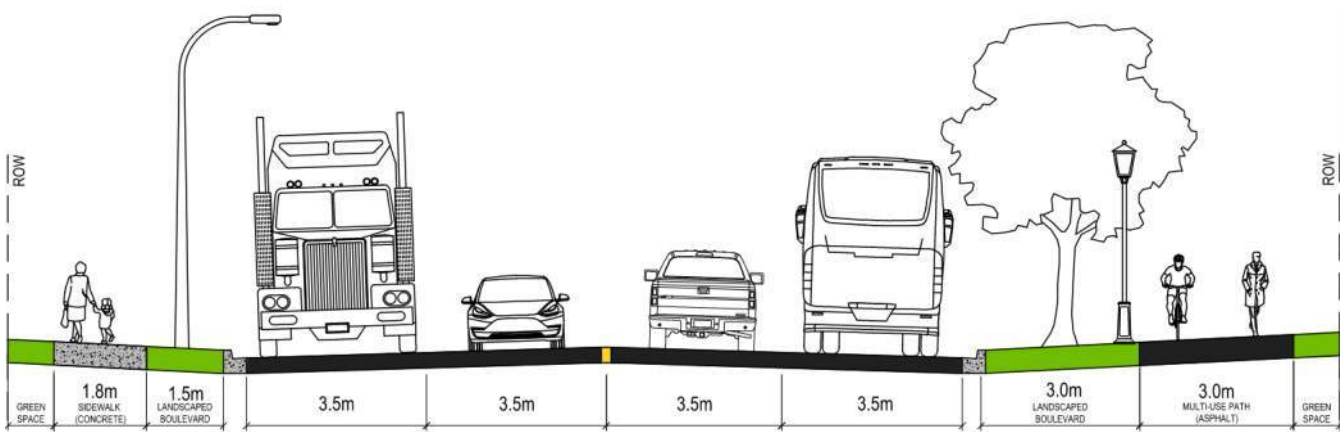


Figure 4: Typical Cross Section– from Belvedere Avenue to Young Street

Figure 5 shows the reduction in landscaped boulevard areas between the multi-use path and the curb and the sidewalk and curb to be 1.2m. This cross-section was generally used along the corridor from Young Street to Euston Street, due to the proximity of buildings to the right-of-way and smaller land parcels.

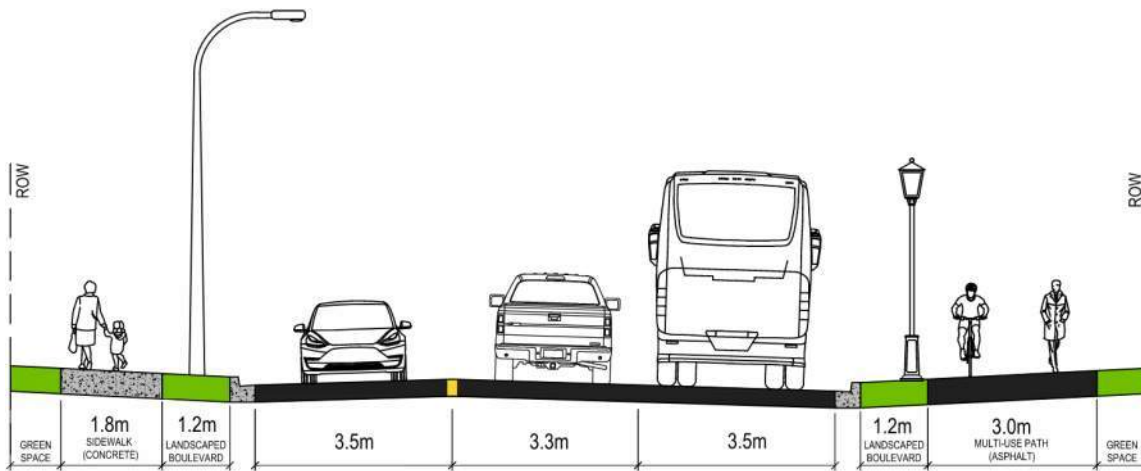


Figure 5: Typical Cross Section – from Young Street to Euston Street

5.4.4 Renderings

Renderings were prepared to assist in visualizing the proposed corridor improvements. The renderings were done for the following locations:

- University Avenue and Belvedere Avenue; and,
- University Avenue and Pond Street.

The renderings are provided in **Appendix 7**.

5.5 Driveways and Access Management

It is recommended, as part of the University Avenue Master Plan, that access management be implemented throughout the corridor. As the study's traffic analysis has shown, vehicles merging their way into the traffic stream from driveways has the potential to cause traffic delays along University Avenue. The large number of driveways and curb cuts also contribute to a cluttered visual perception of the roadway and take away space that could otherwise be used for landscaped edges visually framing the road. Access control, shared parking, shared driveways and generally reducing the number of cars that use these driveways could contribute to better traffic flow and enhanced urban design.

This means reviewing each access point and possibly making changes to driveways so that they are better defined, have an appropriate width, radii, and throat length. The following criteria should be considered:

- Installing a barrier curb on both sides of driveways;
- Providing narrower driveway widths (minimum 7.2m, max 12.0m);
- Providing adequate radius for right-turn movements into and out of driveways (minimum R=4.5m);
- Providing a minimum clear throat length of 8m. Where possible, the throat length should be based on the anticipated driveway traffic volumes.

Some of these potential changes are shown conceptually on the plans, but they should be reevaluated in the detailed design phase and discussed with property owners to better understand their needs and requirements for vehicle access. Also, wherever possible, the City should consider requiring shared parking and shared driveways for new developments, infill and renovations.

5.6 Reallocate On-Street Parking to Other Streets

It is anticipated that keeping on-street parking spaces will be very challenging due to the addition of bicycle facilities and limited right-of-way space. In order to support active transportation, it is recommended that cyclists and pedestrians be prioritized. This will mean that many on-street parking spaces will need to be reallocated to other streets. The final placement of on-street parking spaces will be determined during the detailed design phase. However, if right-of-way is available, on-street parking and on-street loading could be permitted on University Avenue. The concept plan shows a few parking spaces could be accommodated at:

- 299 University Avenue (2 spaces);
- 251 and 245 University Avenue (3 spaces); and,
- 225, 223, 219 University Avenue (2 spaces).

It is advised that discussions with the affected property owners be undertaken prior to proceeding with the detailed design.

5.7 Utilities

In order to enhance the aesthetics of the corridor and improve roadway safety, it is recognized that removing poles and relocating the overhead utility lines to below ground would be beneficial. This would reduce the amount of clutter along the roadway and would allow for the installation of decorative streetlights, street trees, and other types of vegetation.

Another benefit of placing the utility lines below ground is that they are less susceptible to extreme weather events (e.g. freezing rain, hurricanes). With the impacts of climate change on our region, the frequency of severe weather events has increased and should therefore be considered as part future infrastructure renewal projects.

The key utilities, Maritime Electric and BellAliant, were contacted during this study and provided input in the cost estimation. These were incorporated in the overall project costs and are detailed in **Section 6**.

With the understanding that the costs are quite substantial, the City may not be able to afford relocating all the utilities below ground, or not be able to acquire right-of-way to accommodate below ground utility corridors. In this situation, the City could perhaps consider relocating utilities underground only along certain sections of the corridor or combining communication and power lines on the same poles. This could free-up some valuable right-of-way space and possibly allow for the reduction in amount utility poles required along the corridor.

5.8 Signs

5.8.1 Street Name Signs

To improve wayfinding within urban centers, many municipalities have adopted policies whereby street name signs are installed on truss arms at signalized intersections. These signs help motorists quickly identify street names since these are typically located within the driver's primary cone of vision and are of larger text size.

Since many of the intersections along the corridor will require improvements to traffic signal assemblies, it would be a good opportunity to incorporate street name signs in the design to ensure that poles and truss arms can be fabricated to handle potential wind loads associated with signage installation.

5.8.2 Commercial Signs

It is recommended, as part of the roadway corridor improvements, that the City review and address the conformance of commercial signs against their by-laws. Some signs appear to be located too close to the edge of property, do not seem to have the proper clearance from the ground (based on size), and are sometimes located within the sight-triangle of intersections.

Illuminated signs should also be reviewed to ensure that they do not emit too much light and have appropriate dimmers for night-time conditions.

5.9 Existing Underground Infrastructure

Any time a street reconstruction or rehabilitation plan is proposed for a roadway corridor, it is a great opportunity to complete upgrades and/or rehabilitation to existing underground infrastructure such as water systems, storm sewers and sanitary sewers. It is recommended that the analysis and review of such systems be completed during the detailed design of the corridor and improvements implemented as required.

6 Opinion of Probable Construction Costs

A complete corridor upgrade of University Avenue from Euston Street to Belvedere Avenue is a major undertaking that will take several years to complete. Therefore, an implementation plan is required to sequence the work, taking into consideration the priority needs of the corridor, the City’s plans for street recapitalization, coordination with other construction projects and traffic disruptions, utility impacts, property acquisition, and budgetary constraints.

A proposed implementation plan is suggested below, which would see the project constructed over six (6) phases. The anticipated costs to implement each phase are provided below in **Table 8**. These costs include items such as traffic signal equipment, concrete curb, asphalt, concrete sidewalk, landscaping, catch basins, and pavement markings. The costs do not include land acquisitions or underground infrastructure rehabilitation/improvements. The utility costs that were estimated by Maritime Electric and BellAliant and were provided for the entire corridor, not by phase. Additional information regarding the estimated costs are provided in **Appendix 8**.

With regards to priorities, it is recommended that, since the intersection at University Avenue and Belvedere Avenue is the one with the most reported collisions, that it should be part of the first phase of improvements. However, recognizing that some sections of the corridor may have more challenging land acquisitions than others, the phasing of construction may take on alternative approaches.

Table 8: Summary of Estimated Costs

Phase No.	Description	Approximate Length of Roadway	Costs
Municipal Infrastructure Costs			
1	Belvedere to Indigo Driveway	250m	\$ 2,130,000
2	Indigo Driveway to CBC Driveway	300m	\$ 1,460,000
3	CBC Driveway to Young Street	340m	\$ 1,540,000
4	Young Street to Lincoln Street	270m	\$ 1,280,000
5	Lincoln Street to Alley Street	370m	\$ 990,000
6	Alley Street to Euston Street	200m	\$ 1,210,000
	Sub-total (Municipal) (not including land acquisition)		\$ 8,610,000
	Maritime Electric Budget		\$ 3,150,000
	BellAliant Budget		\$ 2,830,000
	Sub-total (Utilities)		\$ 5,980,000
	Total		\$ 14,590,000

7 Conclusion

This Master Plan enables municipal staff, residents, stakeholders and Council to develop a more detailed understanding of the opportunities and limitations for improving this section of the University Avenue corridor. The objectives of the Master Plan were to:

- Improve safety along the corridor for all roadway users;
- Improve active transportation infrastructure;
- Improve aesthetics (e.g. providing more green space); and,
- Improve traffic flow.

The study of the University Avenue corridor was completed by doing a review the existing conditions, an analysis of traffic operations of the major intersections, and developing recommendations for the various roadway elements.

7.1 Recommendations

The recommended improvements for the University Avenue corridor were described in Section 4 and 5 of this report. A summary of the recommendations is provided in **Table 9** below.

Table 9: Summary of Recommendations

Roadway Users	Description	Section
Vehicles	<ul style="list-style-type: none"> • Provide Various Intersection Improvements, including: <ul style="list-style-type: none"> ○ New Traffic Signals at Indigo Driveway and RCMP Driveway ○ New Traffic Signals at Pond Street Intersection 	4.3
	<ul style="list-style-type: none"> • Provide Improvements at Driveways and Manage Access Points 	5.5
	<ul style="list-style-type: none"> • Reallocate On-Street Parking to Other Street 	5.6
	<ul style="list-style-type: none"> • Improve Roadway Signage 	5.8
Pedestrians	<ul style="list-style-type: none"> • Wider Sidewalks • Increase Green Spaces • Improvements to Pedestrian Crossings • Pedestrian-Level Lighting • Pedestrian Access to Businesses 	5.1
	<ul style="list-style-type: none"> • Improvements at Transit Bus Stops (Lighting, Accessible Surface, Signage) 	5.2
	<ul style="list-style-type: none"> • Relocate some of the Utilities 	5.7
Cyclists	<ul style="list-style-type: none"> • Construct a Multi-Use Path Along the Entire Corridor 	5.3
	<ul style="list-style-type: none"> • Provide More Bicycle Racks 	
	<ul style="list-style-type: none"> • Plan for Additional Connectivity to Other Bicycle Facilities 	

A concept plan and renderings were also provided to assist with illustrating some of the proposed roadway improvements. These drawings are included in **Appendix 5 and 7**.

7.2 Key Considerations

The Concept Plans were prepared based on aerial imagery and are therefore considered to be preliminary concept sketches. In order to incorporate all of the roadway elements that were recommended, the following items will need further evaluations:

- **Right-of-Way Acquisitions:** The University Avenue corridor has varying right-of-way widths and constraints with existing developments. To implement the recommendations of the Master Plan, additional right-of-way will be required. The final location of proposed right-of-way limits should be determined during the design phase with appropriate topographic and legal survey.
- **Utility Relocates:** The costs to relocate some of the utilities may be attainable along certain sections of corridor, while on some other sections, they would be too expensive. Refinement of the costs will need to be further evaluated during the detailed design phase.
- **Underground Infrastructure:** Upgrades to the existing water, storm sewer and sanitary sewer were not included in the scope of this study. Proposed upgrades and/or rehabilitation of existing systems should be considered and implemented into the detailed design.
- **Landscape Architecture:** The look and feel of the roadway could be further refined based on type of streetlight fixtures, landscape elements, benches, and other street hardware. The improved aesthetics of the corridor should therefore be refined with assistance of a landscape architect.

Appendix 1 –
Intersection Counts



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Count Name: University Avenue / Nassau Street
Site Code:
Start Date: 07/14/2020
Page No: 1

Turning Movement Data

Start Time	Southbound Approach					Northbound Approach					Eastbound Approach					Int. Total
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
7:00 AM	14	45	0	0	59	39	6	0	1	45	2	8	0	1	10	114
7:15 AM	9	62	0	0	71	40	8	0	0	48	3	9	0	0	12	131
7:30 AM	17	109	0	3	126	65	7	0	0	72	10	16	0	2	26	224
7:45 AM	11	107	0	1	118	78	5	0	0	83	7	24	0	4	31	232
Hourly Total	51	323	0	4	374	222	26	0	1	248	22	57	0	7	79	701
8:00 AM	17	110	0	2	127	64	4	0	0	68	5	19	0	2	24	219
8:15 AM	16	100	0	1	116	70	4	0	0	74	9	18	0	0	27	217
8:30 AM	16	90	0	1	106	85	6	0	0	91	5	23	0	6	28	225
8:45 AM	19	115	0	1	134	112	3	0	0	115	14	16	0	2	30	279
Hourly Total	68	415	0	5	483	331	17	0	0	348	33	76	0	10	109	940
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	12	157	0	0	169	160	10	0	0	170	11	16	0	2	27	366
11:45 AM	23	173	0	3	196	162	12	0	0	174	11	18	0	3	29	399
Hourly Total	35	330	0	3	365	322	22	0	0	344	22	34	0	5	56	765
12:00 PM	21	184	0	5	205	167	5	0	0	172	9	25	0	1	34	411
12:15 PM	27	198	0	3	225	177	3	0	0	180	17	16	0	4	33	438
12:30 PM	26	162	0	0	188	184	10	0	1	194	23	27	0	4	50	432
12:45 PM	14	201	0	2	215	155	14	0	0	169	15	35	0	3	50	434
Hourly Total	88	745	0	10	833	683	32	0	1	715	64	103	0	12	167	1715
1:00 PM	21	190	0	1	211	165	2	0	0	167	17	28	0	1	45	423
1:15 PM	22	180	0	2	202	191	7	0	0	198	15	25	0	0	40	440
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	43	370	0	3	413	356	9	0	0	365	32	53	0	1	85	863
4:00 PM	16	207	0	3	223	173	2	0	0	175	11	34	0	5	45	443
4:15 PM	13	162	0	6	175	189	11	0	1	200	12	28	0	8	40	415
4:30 PM	17	166	0	1	183	162	9	0	0	171	11	29	0	6	40	394
4:45 PM	26	175	0	4	201	176	11	0	0	187	13	21	0	6	34	422
Hourly Total	72	710	0	14	782	700	33	0	1	733	47	112	0	25	159	1674
5:00 PM	26	180	0	3	206	186	9	0	0	195	8	23	0	0	31	432
5:15 PM	12	164	0	3	176	164	8	0	0	172	7	22	0	4	29	377
5:30 PM	12	139	0	4	151	137	4	0	0	141	6	18	0	0	24	316
5:45 PM	16	149	0	1	165	130	5	0	0	135	5	11	0	6	16	316
Hourly Total	66	632	0	11	698	617	26	0	0	643	26	74	0	10	100	1441
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	423	3525	0	50	3948	3231	165	0	3	3396	246	509	0	70	755	8099

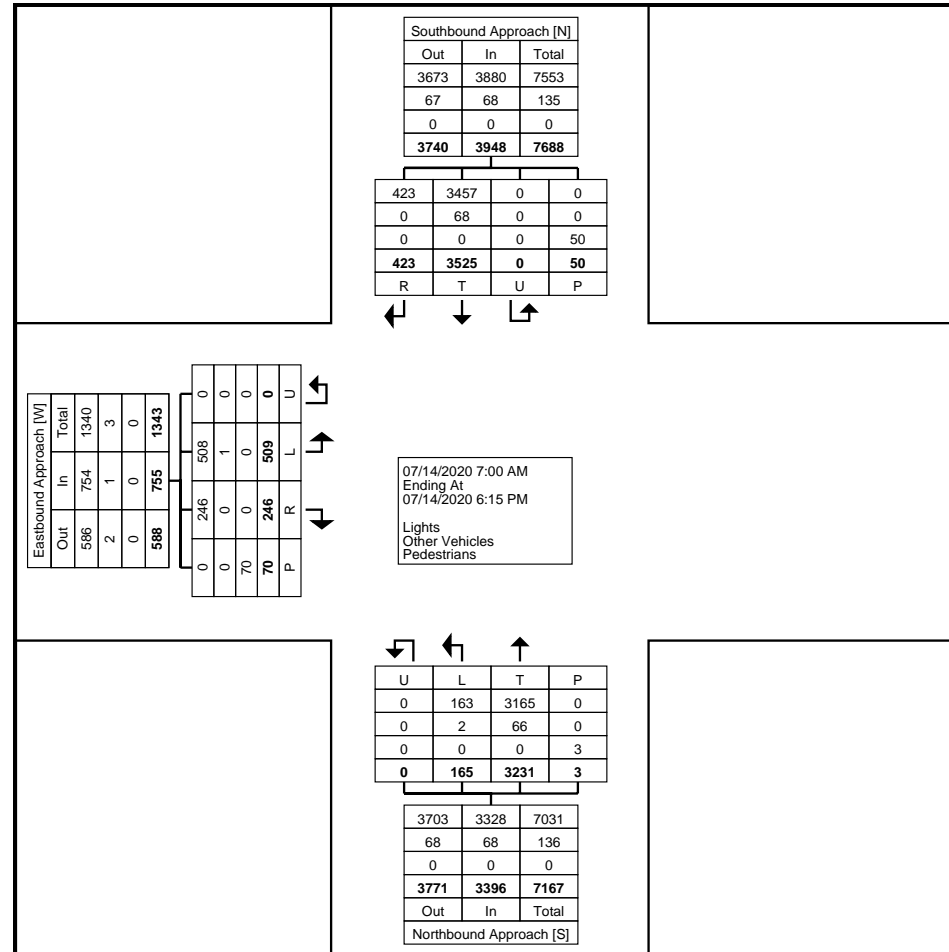
Approach %	10.7	89.3	0.0	-	-	95.1	4.9	0.0	-	-	32.6	67.4	0.0	-	-	-
Total %	5.2	43.5	0.0	-	48.7	39.9	2.0	0.0	-	41.9	3.0	6.3	0.0	-	9.3	-
Lights	423	3457	0	-	3880	3165	163	0	-	3328	246	508	0	-	754	7962
% Lights	100.0	98.1	-	-	98.3	98.0	98.8	-	-	98.0	100.0	99.8	-	-	99.9	98.3
Other Vehicles	0	68	0	-	68	66	2	0	-	68	0	1	0	-	1	137
% Other Vehicles	0.0	1.9	-	-	1.7	2.0	1.2	-	-	2.0	0.0	0.2	-	-	0.1	1.7
Pedestrians	-	-	-	50	-	-	-	-	3	-	-	-	-	70	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



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Page No: 3



Turning Movement Data Plot



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Count Name: University Avenue / Nassau Street
Site Code:
Start Date: 07/14/2020
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Turning Movement Peak Hour Data (8:00 AM)

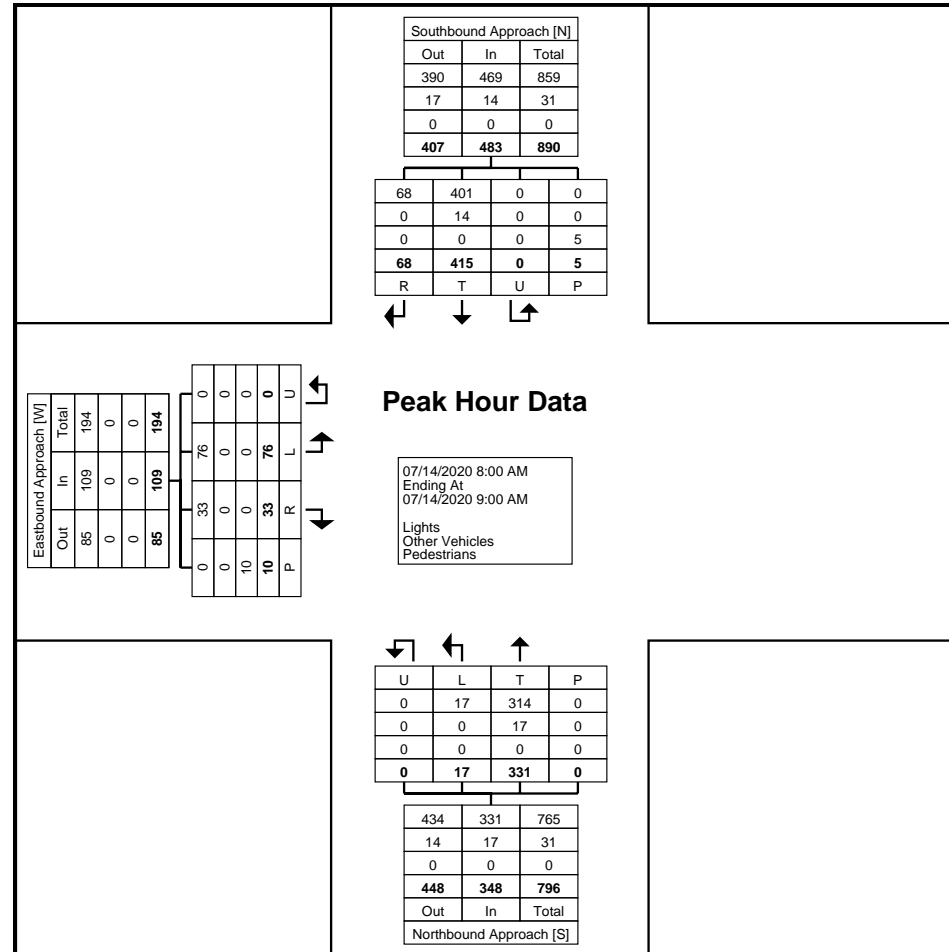
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	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
8:00 AM	17	110	0	2	127	64	4	0	0	68	5	19	0	2	24	219
8:15 AM	16	100	0	1	116	70	4	0	0	74	9	18	0	0	27	217
8:30 AM	16	90	0	1	106	85	6	0	0	91	5	23	0	6	28	225
8:45 AM	19	115	0	1	134	112	3	0	0	115	14	16	0	2	30	279
Total	68	415	0	5	483	331	17	0	0	348	33	76	0	10	109	940
Approach %	14.1	85.9	0.0	-	-	95.1	4.9	0.0	-	-	30.3	69.7	0.0	-	-	-
Total %	7.2	44.1	0.0	-	51.4	35.2	1.8	0.0	-	37.0	3.5	8.1	0.0	-	11.6	-
PHF	0.895	0.902	0.000	-	0.901	0.739	0.708	0.000	-	0.757	0.589	0.826	0.000	-	0.908	0.842
Lights	68	401	0	-	469	314	17	0	-	331	33	76	0	-	109	909
% Lights	100.0	96.6	-	-	97.1	94.9	100.0	-	-	95.1	100.0	100.0	-	-	100.0	96.7
Other Vehicles	0	14	0	-	14	17	0	0	-	17	0	0	0	-	0	31
% Other Vehicles	0.0	3.4	-	-	2.9	5.1	0.0	-	-	4.9	0.0	0.0	-	-	0.0	3.3
Pedestrians	-	-	-	5	-	-	-	-	0	-	-	-	-	10	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-



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Turning Movement Peak Hour Data Plot (8:00 AM)



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Site Code:
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Turning Movement Peak Hour Data (12:30 PM)

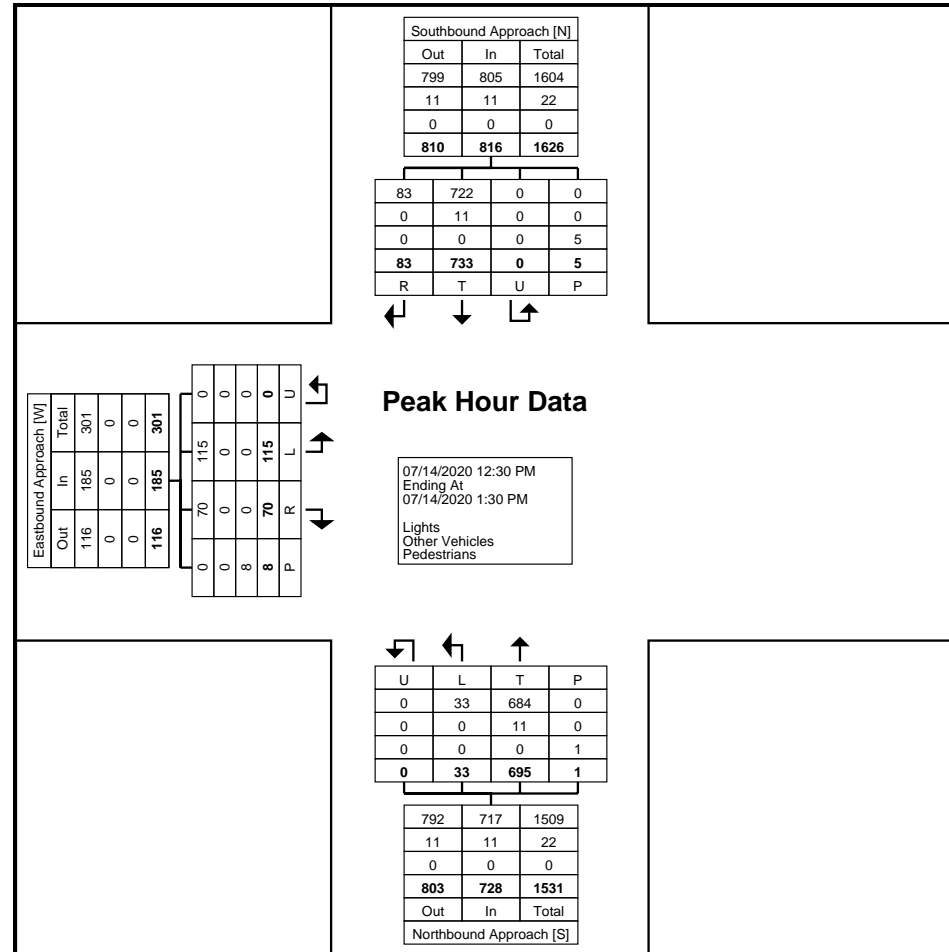
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	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
12:30 PM	26	162	0	0	188	184	10	0	1	194	23	27	0	4	50	432
12:45 PM	14	201	0	2	215	155	14	0	0	169	15	35	0	3	50	434
1:00 PM	21	190	0	1	211	165	2	0	0	167	17	28	0	1	45	423
1:15 PM	22	180	0	2	202	191	7	0	0	198	15	25	0	0	40	440
Total	83	733	0	5	816	695	33	0	1	728	70	115	0	8	185	1729
Approach %	10.2	89.8	0.0	-	-	95.5	4.5	0.0	-	-	37.8	62.2	0.0	-	-	-
Total %	4.8	42.4	0.0	-	47.2	40.2	1.9	0.0	-	42.1	4.0	6.7	0.0	-	10.7	-
PHF	0.798	0.912	0.000	-	0.949	0.910	0.589	0.000	-	0.919	0.761	0.821	0.000	-	0.925	0.982
Lights	83	722	0	-	805	684	33	0	-	717	70	115	0	-	185	1707
% Lights	100.0	98.5	-	-	98.7	98.4	100.0	-	-	98.5	100.0	100.0	-	-	100.0	98.7
Other Vehicles	0	11	0	-	11	11	0	0	-	11	0	0	0	-	0	22
% Other Vehicles	0.0	1.5	-	-	1.3	1.6	0.0	-	-	1.5	0.0	0.0	-	-	0.0	1.3
Pedestrians	-	-	-	5	-	-	-	-	1	-	-	-	-	8	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



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Turning Movement Peak Hour Data Plot (12:30 PM)



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Turning Movement Peak Hour Data (4:00 PM)

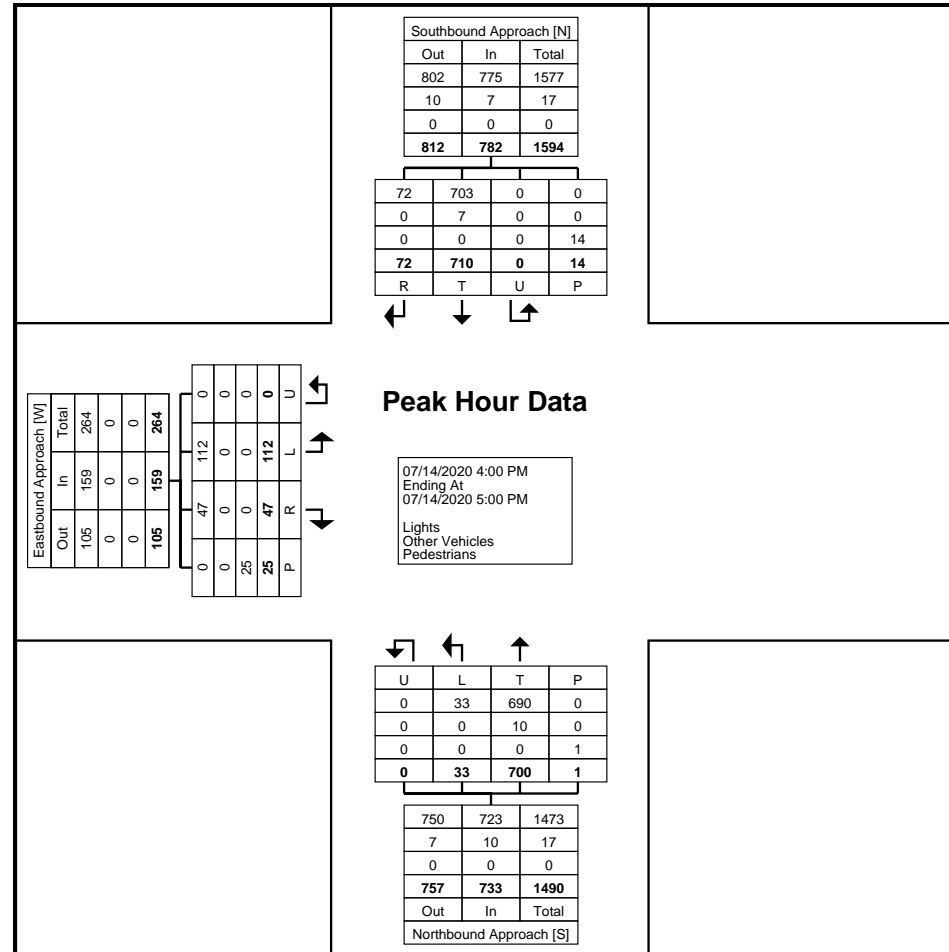
Start Time	Southbound Approach					Northbound Approach					Eastbound Approach					Int. Total
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
4:00 PM	16	207	0	3	223	173	2	0	0	175	11	34	0	5	45	443
4:15 PM	13	162	0	6	175	189	11	0	1	200	12	28	0	8	40	415
4:30 PM	17	166	0	1	183	162	9	0	0	171	11	29	0	6	40	394
4:45 PM	26	175	0	4	201	176	11	0	0	187	13	21	0	6	34	422
Total	72	710	0	14	782	700	33	0	1	733	47	112	0	25	159	1674
Approach %	9.2	90.8	0.0	-	-	95.5	4.5	0.0	-	-	29.6	70.4	0.0	-	-	-
Total %	4.3	42.4	0.0	-	46.7	41.8	2.0	0.0	-	43.8	2.8	6.7	0.0	-	9.5	-
PHF	0.692	0.857	0.000	-	0.877	0.926	0.750	0.000	-	0.916	0.904	0.824	0.000	-	0.883	0.945
Lights	72	703	0	-	775	690	33	0	-	723	47	112	0	-	159	1657
% Lights	100.0	99.0	-	-	99.1	98.6	100.0	-	-	98.6	100.0	100.0	-	-	100.0	99.0
Other Vehicles	0	7	0	-	7	10	0	0	-	10	0	0	0	-	0	17
% Other Vehicles	0.0	1.0	-	-	0.9	1.4	0.0	-	-	1.4	0.0	0.0	-	-	0.0	1.0
Pedestrians	-	-	-	14	-	-	-	-	1	-	-	-	-	25	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue / Nassau Street
Site Code:
Start Date: 07/14/2020
Page No: 9



Turning Movement Peak Hour Data Plot (4:00 PM)



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue / Nassau Street
Site Code:
Start Date: 07/14/2020
Page No: 10



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Kirkwood
Drive/Allen Street
Site Code:
Start Date: 07/14/2020
Page No: 1

Turning Movement Data

Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	2	40	18	0	0	60	20	6	7	0	1	33	3	29	0	0	0	32	3	22	2	0	1	27	152
7:15 AM	4	52	19	0	0	75	18	7	8	0	0	33	1	36	2	0	1	39	1	25	3	0	2	29	176
7:30 AM	6	77	32	0	0	115	38	14	10	0	0	62	5	49	3	0	0	57	2	40	5	0	3	47	281
7:45 AM	12	97	32	0	4	141	28	32	20	0	0	80	4	58	5	0	0	67	0	44	10	0	1	54	342
Hourly Total	24	266	101	0	4	391	104	59	45	0	1	208	13	172	10	0	1	195	6	131	20	0	7	157	951
8:00 AM	3	97	35	0	1	135	31	27	22	0	1	80	5	40	2	0	0	47	3	31	9	0	3	43	305
8:15 AM	8	84	35	0	2	127	38	19	15	0	0	72	7	46	7	0	0	60	2	40	8	0	0	50	309
8:30 AM	7	80	31	0	0	118	39	29	18	0	0	86	4	53	7	0	1	64	5	34	7	0	1	46	314
8:45 AM	3	86	41	0	0	130	42	31	20	0	0	93	13	60	2	0	1	75	4	36	15	0	2	55	353
Hourly Total	21	347	142	0	3	510	150	106	75	0	1	331	29	199	18	0	2	246	14	141	39	0	6	194	1281
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	12	114	63	0	2	189	48	32	37	0	0	117	18	106	8	0	0	132	8	38	14	0	2	60	498
11:45 AM	9	112	59	0	1	180	48	29	39	0	1	116	15	118	5	0	1	138	8	46	11	0	6	65	499
Hourly Total	21	226	122	0	3	369	96	61	76	0	1	233	33	224	13	0	1	270	16	84	25	0	8	125	997
12:00 PM	19	121	59	0	0	199	55	41	41	0	1	137	27	99	13	0	1	139	11	37	18	0	5	66	541
12:15 PM	10	142	63	0	2	215	55	42	42	0	0	139	18	111	7	0	0	136	7	49	24	0	4	80	570
12:30 PM	22	123	56	0	4	201	57	43	29	0	1	129	15	128	7	0	0	150	6	52	18	0	6	76	556
12:45 PM	18	135	68	0	2	221	47	44	41	0	5	132	26	100	6	0	2	132	12	58	26	0	7	96	581
Hourly Total	69	521	246	0	8	836	214	170	153	0	7	537	86	438	33	0	3	557	36	196	86	0	22	318	2248
1:00 PM	15	124	68	0	1	207	52	46	56	0	0	154	25	109	9	0	1	143	7	46	10	0	3	63	567
1:15 PM	12	120	66	0	2	198	58	27	46	0	1	131	19	120	8	0	0	147	7	41	24	0	1	72	548
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	27	244	134	0	3	405	110	73	102	0	1	285	44	229	17	0	1	290	14	87	34	0	4	135	1115
4:00 PM	14	116	61	0	3	191	46	47	44	0	3	137	14	109	7	0	2	130	8	55	26	0	9	89	547
4:15 PM	13	117	69	0	3	199	53	54	36	0	4	143	17	111	13	0	4	141	7	56	23	0	9	86	569
4:30 PM	15	98	58	0	1	171	53	53	39	0	0	145	24	106	15	0	1	145	6	48	17	0	3	71	532
4:45 PM	20	110	61	0	1	191	49	47	51	0	0	147	16	116	6	0	0	138	6	55	10	0	1	71	547
Hourly Total	62	441	249	0	8	752	201	201	170	0	7	572	71	442	41	0	7	554	27	214	76	0	22	317	2195
5:00 PM	10	126	62	0	2	198	53	47	46	0	1	146	20	118	10	0	3	148	7	45	19	0	2	71	563
5:15 PM	5	109	58	0	1	172	50	37	26	0	1	113	20	98	6	0	0	124	6	38	12	0	3	56	465
5:30 PM	7	107	34	0	1	148	31	49	39	0	0	119	12	87	9	0	0	108	9	44	15	0	4	68	443
5:45 PM	6	102	50	0	8	158	30	27	37	0	0	94	11	85	10	0	1	106	7	45	25	0	6	77	435
Hourly Total	28	444	204	0	12	676	164	160	148	0	2	472	63	388	35	0	4	486	29	172	71	0	15	272	1906
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

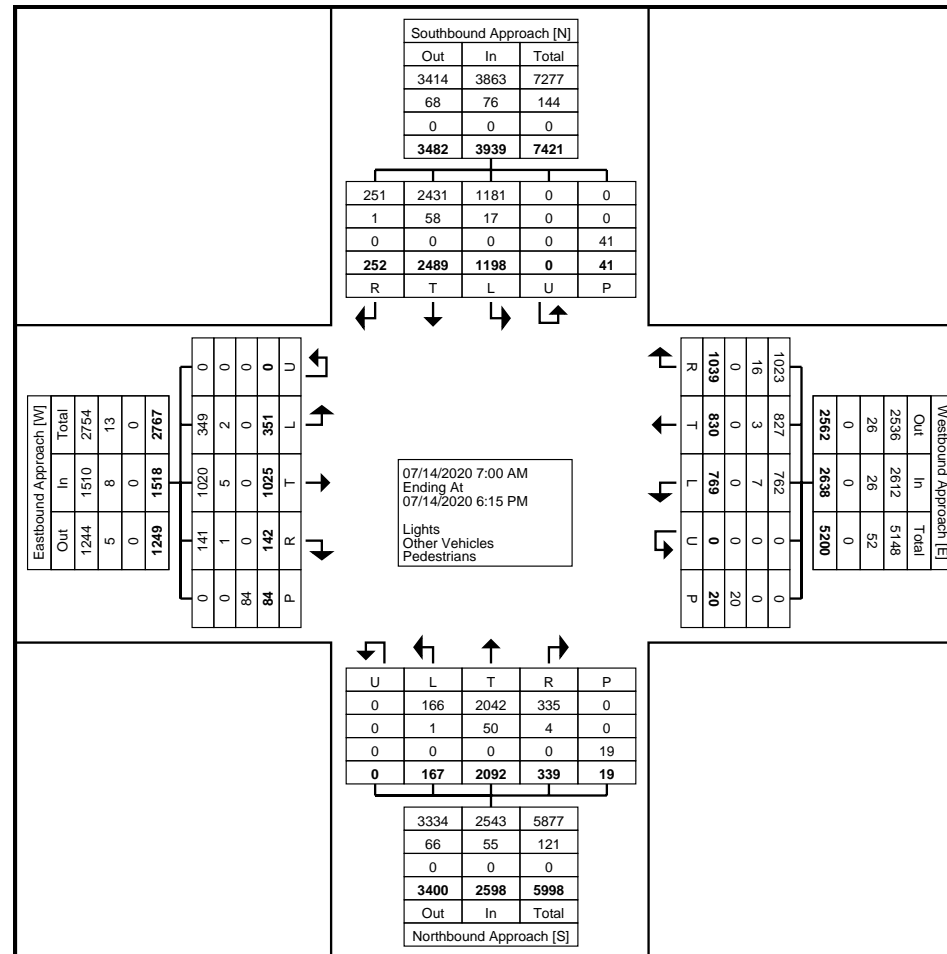
Grand Total	252	2489	1198	0	41	3939	1039	830	769	0	20	2638	339	2092	167	0	19	2598	142	1025	351	0	84	1518	10693
Approach %	6.4	63.2	30.4	0.0	-	-	39.4	31.5	29.2	0.0	-	-	13.0	80.5	6.4	0.0	-	-	9.4	67.5	23.1	0.0	-	-	-
Total %	2.4	23.3	11.2	0.0	-	36.8	9.7	7.8	7.2	0.0	-	24.7	3.2	19.6	1.6	0.0	-	24.3	1.3	9.6	3.3	0.0	-	14.2	-
Lights	251	2431	1181	0	-	3863	1023	827	762	0	-	2612	335	2042	166	0	-	2543	141	1020	349	0	-	1510	10528
% Lights	99.6	97.7	98.6	-	-	98.1	98.5	99.6	99.1	-	-	99.0	98.8	97.6	99.4	-	-	97.9	99.3	99.5	99.4	-	-	99.5	98.5
Other Vehicles	1	58	17	0	-	76	16	3	7	0	-	26	4	50	1	0	-	55	1	5	2	0	-	8	165
% Other Vehicles	0.4	2.3	1.4	-	-	1.9	1.5	0.4	0.9	-	-	1.0	1.2	2.4	0.6	-	-	2.1	0.7	0.5	0.6	-	-	0.5	1.5
Pedestrians	-	-	-	-	41	-	-	-	-	-	20	-	-	-	-	-	19	-	-	-	-	-	84	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Kirkwood
Drive/Allen Street
Site Code:
Start Date: 07/14/2020
Page No: 3



Turning Movement Data Plot



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue/Kirkwood
Drive/Allen Street
Site Code:
Start Date: 07/14/2020
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

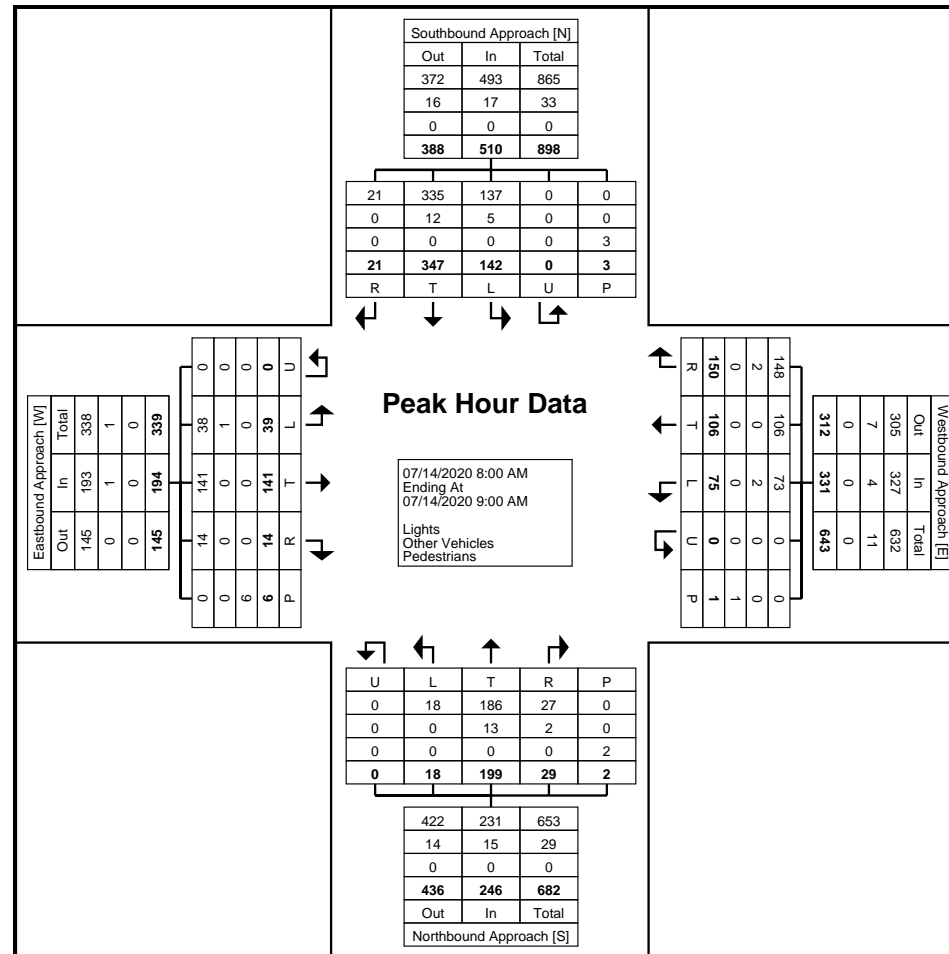
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
8:00 AM	3	97	35	0	1	135	31	27	22	0	1	80	5	40	2	0	0	47	3	31	9	0	3	43	305
8:15 AM	8	84	35	0	2	127	38	19	15	0	0	72	7	46	7	0	0	60	2	40	8	0	0	50	309
8:30 AM	7	80	31	0	0	118	39	29	18	0	0	86	4	53	7	0	1	64	5	34	7	0	1	46	314
8:45 AM	3	86	41	0	0	130	42	31	20	0	0	93	13	60	2	0	1	75	4	36	15	0	2	55	353
Total	21	347	142	0	3	510	150	106	75	0	1	331	29	199	18	0	2	246	14	141	39	0	6	194	1281
Approach %	4.1	68.0	27.8	0.0	-	-	45.3	32.0	22.7	0.0	-	-	11.8	80.9	7.3	0.0	-	-	7.2	72.7	20.1	0.0	-	-	-
Total %	1.6	27.1	11.1	0.0	-	39.8	11.7	8.3	5.9	0.0	-	25.8	2.3	15.5	1.4	0.0	-	19.2	1.1	11.0	3.0	0.0	-	15.1	-
PHF	0.656	0.894	0.866	0.000	-	0.944	0.893	0.855	0.852	0.000	-	0.890	0.558	0.829	0.643	0.000	-	0.820	0.700	0.881	0.650	0.000	-	0.882	0.907
Lights	21	335	137	0	-	493	148	106	73	0	-	327	27	186	18	0	-	231	14	141	38	0	-	193	1244
% Lights	100.0	96.5	96.5	-	-	96.7	98.7	100.0	97.3	-	-	98.8	93.1	93.5	100.0	-	-	93.9	100.0	100.0	97.4	-	-	99.5	97.1
Other Vehicles	0	12	5	0	-	17	2	0	2	0	-	4	2	13	0	0	-	15	0	0	1	0	-	1	37
% Other Vehicles	0.0	3.5	3.5	-	-	3.3	1.3	0.0	2.7	-	-	1.2	6.9	6.5	0.0	-	-	6.1	0.0	0.0	2.6	-	-	0.5	2.9
Pedestrians	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Kirkwood
Drive/Allen Street
Site Code:
Start Date: 07/14/2020
Page No: 5



Turning Movement Peak Hour Data Plot (8:00 AM)



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue/Kirkwood
Drive/Allen Street
Site Code:
Start Date: 07/14/2020
Page No: 6

Turning Movement Peak Hour Data (12:15 PM)

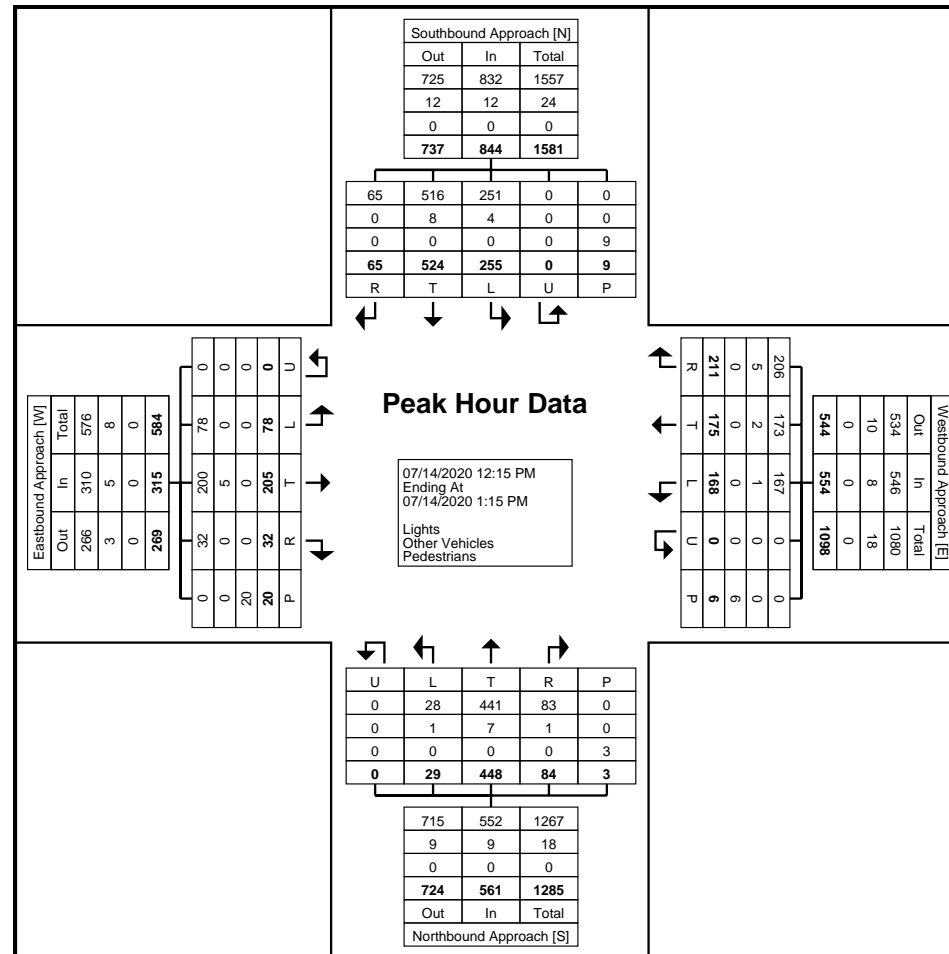
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
12:15 PM	10	142	63	0	2	215	55	42	42	0	0	139	18	111	7	0	0	136	7	49	24	0	4	80	570
12:30 PM	22	123	56	0	4	201	57	43	29	0	1	129	15	128	7	0	0	150	6	52	18	0	6	76	556
12:45 PM	18	135	68	0	2	221	47	44	41	0	5	132	26	100	6	0	2	132	12	58	26	0	7	96	581
1:00 PM	15	124	68	0	1	207	52	46	56	0	0	154	25	109	9	0	1	143	7	46	10	0	3	63	567
Total	65	524	255	0	9	844	211	175	168	0	6	554	84	448	29	0	3	561	32	205	78	0	20	315	2274
Approach %	7.7	62.1	30.2	0.0	-	-	38.1	31.6	30.3	0.0	-	-	15.0	79.9	5.2	0.0	-	-	10.2	65.1	24.8	0.0	-	-	-
Total %	2.9	23.0	11.2	0.0	-	37.1	9.3	7.7	7.4	0.0	-	24.4	3.7	19.7	1.3	0.0	-	24.7	1.4	9.0	3.4	0.0	-	13.9	-
PHF	0.739	0.923	0.938	0.000	-	0.955	0.925	0.951	0.750	0.000	-	0.899	0.808	0.875	0.806	0.000	-	0.935	0.667	0.884	0.750	0.000	-	0.820	0.978
Lights	65	516	251	0	-	832	206	173	167	0	-	546	83	441	28	0	-	552	32	200	78	0	-	310	2240
% Lights	100.0	98.5	98.4	-	-	98.6	97.6	98.9	99.4	-	-	98.6	98.8	98.4	96.6	-	-	98.4	100.0	97.6	100.0	-	-	98.4	98.5
Other Vehicles	0	8	4	0	-	12	5	2	1	0	-	8	1	7	1	0	-	9	0	5	0	0	-	5	34
% Other Vehicles	0.0	1.5	1.6	-	-	1.4	2.4	1.1	0.6	-	-	1.4	1.2	1.6	3.4	-	-	1.6	0.0	2.4	0.0	-	-	1.6	1.5
Pedestrians	-	-	-	-	9	-	-	-	-	-	6	-	-	-	-	-	3	-	-	-	-	-	20	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Count Name: University Avenue/Kirkwood
Drive/Allen Street
Site Code:
Start Date: 07/14/2020
Page No: 7



Turning Movement Peak Hour Data Plot (12:15 PM)



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue/Kirkwood
Drive/Allen Street
Site Code:
Start Date: 07/14/2020
Page No: 8

Turning Movement Peak Hour Data (4:15 PM)

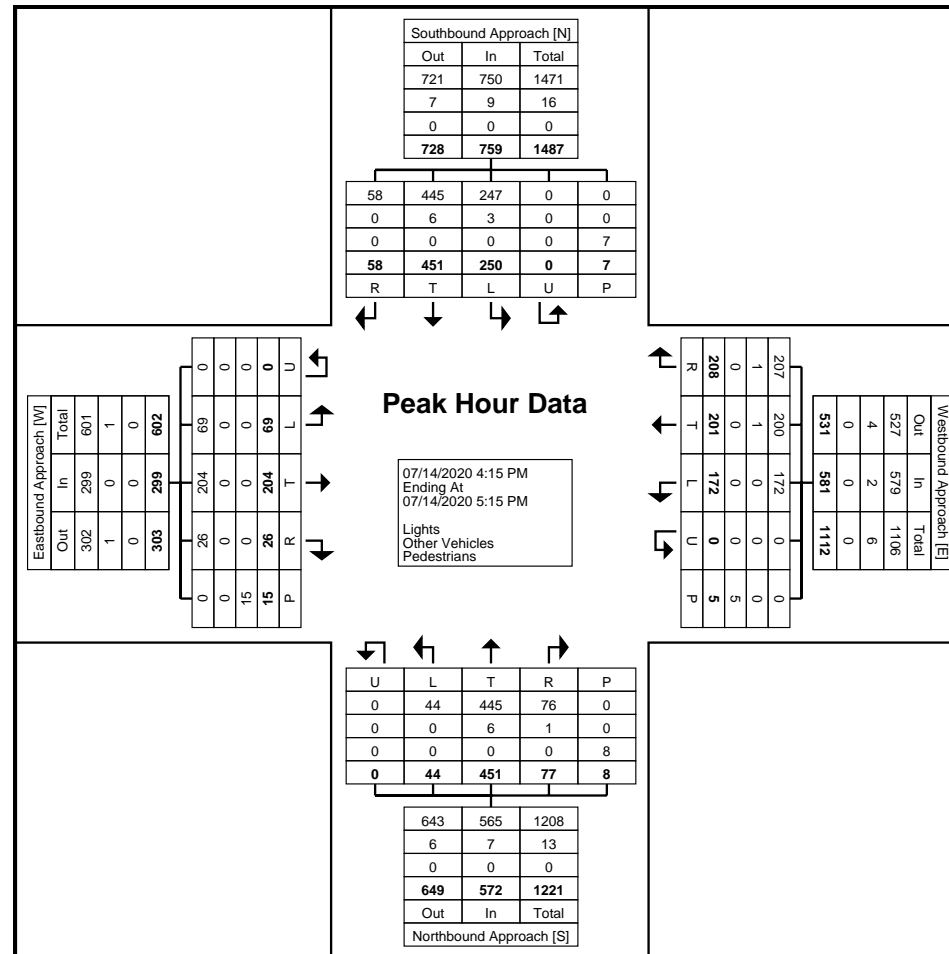
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:15 PM	13	117	69	0	3	199	53	54	36	0	4	143	17	111	13	0	4	141	7	56	23	0	9	86	569
4:30 PM	15	98	58	0	1	171	53	53	39	0	0	145	24	106	15	0	1	145	6	48	17	0	3	71	532
4:45 PM	20	110	61	0	1	191	49	47	51	0	0	147	16	116	6	0	0	138	6	55	10	0	1	71	547
5:00 PM	10	126	62	0	2	198	53	47	46	0	1	146	20	118	10	0	3	148	7	45	19	0	2	71	563
Total	58	451	250	0	7	759	208	201	172	0	5	581	77	451	44	0	8	572	26	204	69	0	15	299	2211
Approach %	7.6	59.4	32.9	0.0	-	-	35.8	34.6	29.6	0.0	-	-	13.5	78.8	7.7	0.0	-	-	8.7	68.2	23.1	0.0	-	-	-
Total %	2.6	20.4	11.3	0.0	-	34.3	9.4	9.1	7.8	0.0	-	26.3	3.5	20.4	2.0	0.0	-	25.9	1.2	9.2	3.1	0.0	-	13.5	-
PHF	0.725	0.895	0.906	0.000	-	0.954	0.981	0.931	0.843	0.000	-	0.988	0.802	0.956	0.733	0.000	-	0.966	0.929	0.911	0.750	0.000	-	0.869	0.971
Lights	58	445	247	0	-	750	207	200	172	0	-	579	76	445	44	0	-	565	26	204	69	0	-	299	2193
% Lights	100.0	98.7	98.8	-	-	98.8	99.5	99.5	100.0	-	-	99.7	98.7	98.7	100.0	-	-	98.8	100.0	100.0	100.0	-	-	100.0	99.2
Other Vehicles	0	6	3	0	-	9	1	1	0	0	-	2	1	6	0	0	-	7	0	0	0	0	-	0	18
% Other Vehicles	0.0	1.3	1.2	-	-	1.2	0.5	0.5	0.0	-	-	0.3	1.3	1.3	0.0	-	-	1.2	0.0	0.0	0.0	-	-	0.0	0.8
Pedestrians	-	-	-	-	7	-	-	-	-	-	5	-	-	-	-	-	8	-	-	-	-	-	15	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Count Name: University Avenue/Kirkwood
Drive/Allen Street
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Start Date: 07/14/2020
Page No: 9



Turning Movement Peak Hour Data Plot (4:15 PM)



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Kirkwood
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Site Code:
Start Date: 07/14/2020
Page No: 10

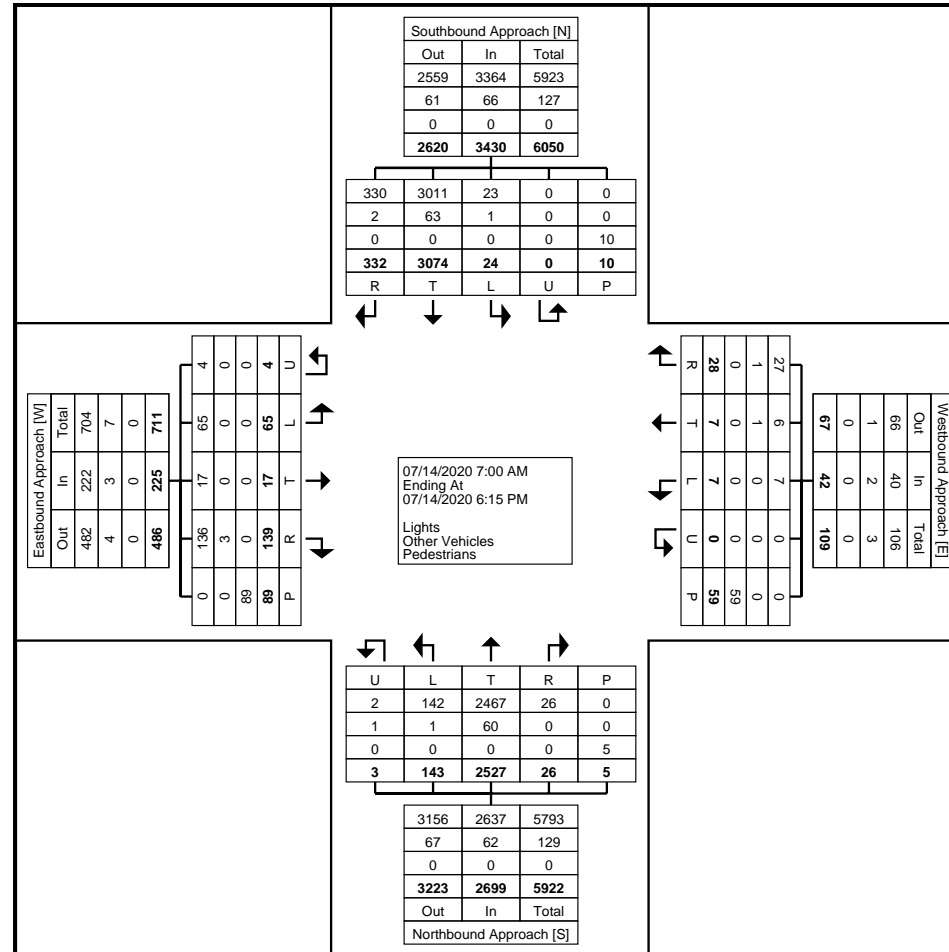
Grand Total	332	3074	24	0	10	3430	28	7	7	0	59	42	26	2527	143	3	5	2699	139	17	65	4	89	225	6396
Approach %	9.7	89.6	0.7	0.0	-	-	66.7	16.7	16.7	0.0	-	-	1.0	93.6	5.3	0.1	-	-	61.8	7.6	28.9	1.8	-	-	-
Total %	5.2	48.1	0.4	0.0	-	53.6	0.4	0.1	0.1	0.0	-	0.7	0.4	39.5	2.2	0.0	-	42.2	2.2	0.3	1.0	0.1	-	3.5	-
Lights	330	3011	23	0	-	3364	27	6	7	0	-	40	26	2467	142	2	-	2637	136	17	65	4	-	222	6263
% Lights	99.4	98.0	95.8	-	-	98.1	96.4	85.7	100.0	-	-	95.2	100.0	97.6	99.3	66.7	-	97.7	97.8	100.0	100.0	100.0	-	98.7	97.9
Other Vehicles	2	63	1	0	-	66	1	1	0	0	-	2	0	60	1	1	-	62	3	0	0	0	-	3	133
% Other Vehicles	0.6	2.0	4.2	-	-	1.9	3.6	14.3	0.0	-	-	4.8	0.0	2.4	0.7	33.3	-	2.3	2.2	0.0	0.0	0.0	-	1.3	2.1
Pedestrians	-	-	-	-	10	-	-	-	-	-	59	-	-	-	-	-	5	-	-	-	-	-	89	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue/Eden Street
Site Code:
Start Date: 07/14/2020
Page No: 3



Turning Movement Data Plot



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue/Eden Street
Site Code:
Start Date: 07/14/2020
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
8:00 AM	7	116	2	0	1	125	1	0	0	0	1	1	0	43	2	0	0	45	2	1	3	0	2	6	177
8:15 AM	3	99	0	0	0	102	1	0	0	0	1	1	0	56	1	0	1	57	0	0	2	0	1	2	162
8:30 AM	6	87	2	0	0	95	0	1	0	0	1	1	0	65	2	0	0	67	2	1	0	0	2	3	166
8:45 AM	8	106	1	0	1	115	1	1	0	0	0	2	0	74	2	0	0	76	4	0	2	0	4	6	199
Total	24	408	5	0	2	437	3	2	0	0	3	5	0	238	7	0	1	245	8	2	7	0	9	17	704
Approach %	5.5	93.4	1.1	0.0	-	-	60.0	40.0	0.0	0.0	-	-	0.0	97.1	2.9	0.0	-	-	47.1	11.8	41.2	0.0	-	-	-
Total %	3.4	58.0	0.7	0.0	-	62.1	0.4	0.3	0.0	0.0	-	0.7	0.0	33.8	1.0	0.0	-	34.8	1.1	0.3	1.0	0.0	-	2.4	-
PHF	0.750	0.879	0.625	0.000	-	0.874	0.750	0.500	0.000	0.000	-	0.625	0.000	0.804	0.875	0.000	-	0.806	0.500	0.500	0.583	0.000	-	0.708	0.884
Lights	24	393	5	0	-	422	2	1	0	0	-	3	0	224	7	0	-	231	7	2	7	0	-	16	672
% Lights	100.0	96.3	100.0	-	-	96.6	66.7	50.0	-	-	-	60.0	-	94.1	100.0	-	-	94.3	87.5	100.0	100.0	-	-	94.1	95.5
Other Vehicles	0	15	0	0	-	15	1	1	0	0	-	2	0	14	0	0	-	14	1	0	0	0	-	1	32
% Other Vehicles	0.0	3.7	0.0	-	-	3.4	33.3	50.0	-	-	-	40.0	-	5.9	0.0	-	-	5.7	12.5	0.0	0.0	-	-	5.9	4.5
Pedestrians	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	9	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Eden Street
Site Code:
Start Date: 07/14/2020
Page No: 6

Turning Movement Peak Hour Data (12:15 PM)

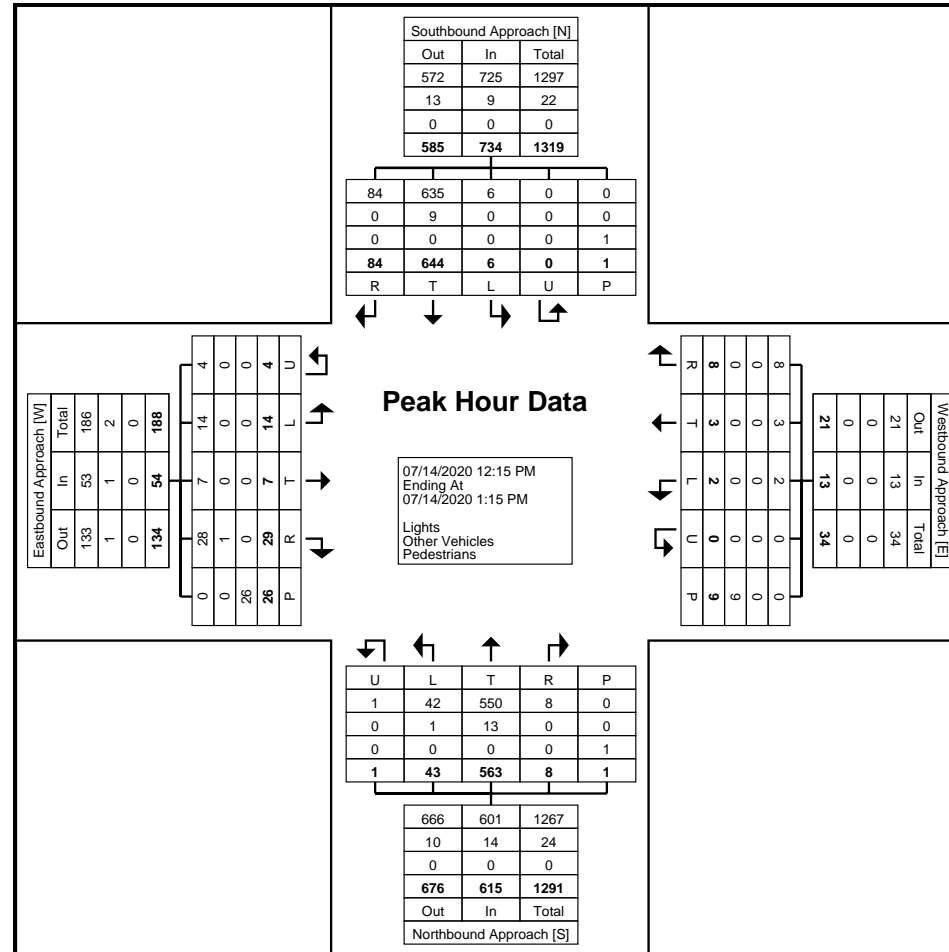
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
12:15 PM	22	167	0	0	0	189	0	1	0	0	0	1	3	142	7	0	0	152	4	2	6	1	8	13	355
12:30 PM	18	145	1	0	0	164	4	2	0	0	2	6	4	150	12	1	0	167	13	1	3	3	8	20	357
12:45 PM	21	175	2	0	0	198	2	0	1	0	2	3	0	132	11	0	0	143	7	3	2	0	5	12	356
1:00 PM	23	157	3	0	1	183	2	0	1	0	5	3	1	139	13	0	1	153	5	1	3	0	5	9	348
Total	84	644	6	0	1	734	8	3	2	0	9	13	8	563	43	1	1	615	29	7	14	4	26	54	1416
Approach %	11.4	87.7	0.8	0.0	-	-	61.5	23.1	15.4	0.0	-	-	1.3	91.5	7.0	0.2	-	-	53.7	13.0	25.9	7.4	-	-	-
Total %	5.9	45.5	0.4	0.0	-	51.8	0.6	0.2	0.1	0.0	-	0.9	0.6	39.8	3.0	0.1	-	43.4	2.0	0.5	1.0	0.3	-	3.8	-
PHF	0.913	0.920	0.500	0.000	-	0.927	0.500	0.375	0.500	0.000	-	0.542	0.500	0.938	0.827	0.250	-	0.921	0.558	0.583	0.583	0.333	-	0.675	0.992
Lights	84	635	6	0	-	725	8	3	2	0	-	13	8	550	42	1	-	601	28	7	14	4	-	53	1392
% Lights	100.0	98.6	100.0	-	-	98.8	100.0	100.0	100.0	-	-	100.0	100.0	97.7	97.7	100.0	-	97.7	96.6	100.0	100.0	100.0	-	98.1	98.3
Other Vehicles	0	9	0	0	-	9	0	0	0	0	-	0	0	13	1	0	-	14	1	0	0	0	-	1	24
% Other Vehicles	0.0	1.4	0.0	-	-	1.2	0.0	0.0	0.0	-	-	0.0	0.0	2.3	2.3	0.0	-	2.3	3.4	0.0	0.0	0.0	-	1.9	1.7
Pedestrians	-	-	-	-	1	-	-	-	-	-	9	-	-	-	-	-	1	-	-	-	-	-	26	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



EXP Services Inc
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Count Name: University Avenue/Eden Street
Site Code:
Start Date: 07/14/2020
Page No: 7



Turning Movement Peak Hour Data Plot (12:15 PM)



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Eden Street
Site Code:
Start Date: 07/14/2020
Page No: 8

Turning Movement Peak Hour Data (4:15 PM)

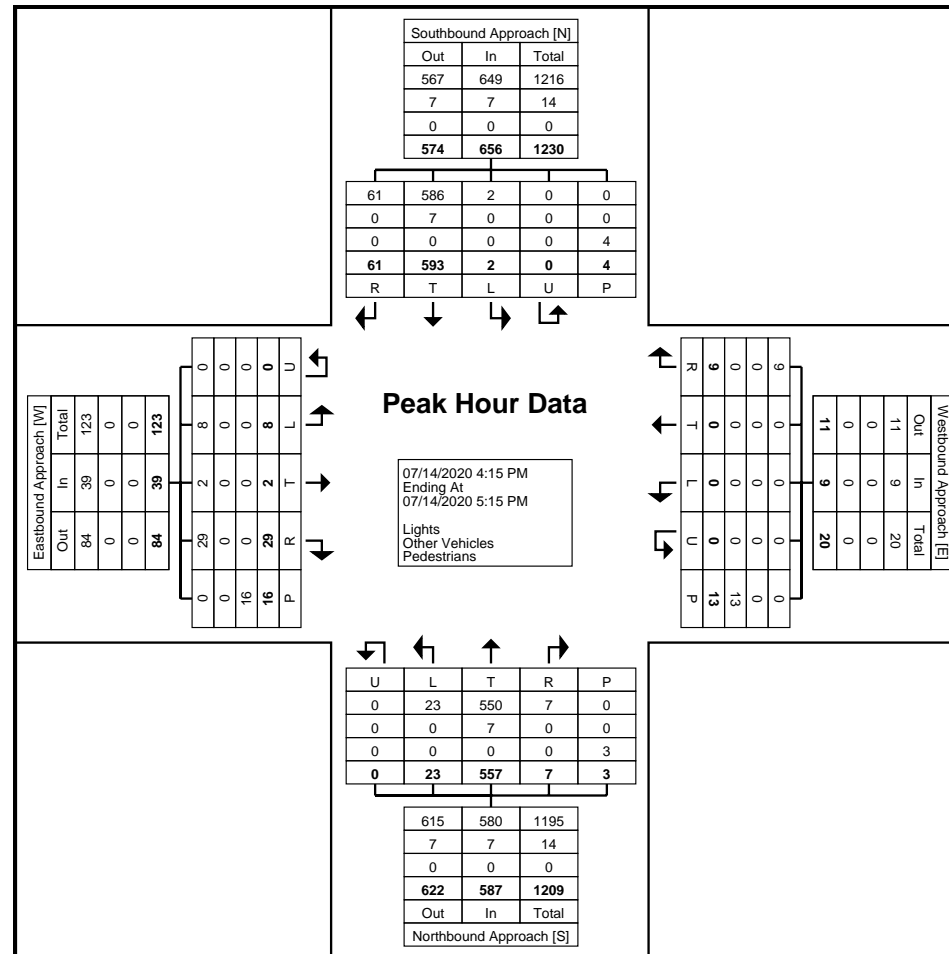
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:15 PM	21	147	1	0	2	169	1	0	0	0	7	1	1	136	5	0	1	142	9	1	2	0	6	12	324
4:30 PM	11	131	1	0	0	143	3	0	0	0	2	3	3	134	10	0	0	147	5	0	3	0	4	8	301
4:45 PM	16	154	0	0	2	170	3	0	0	0	3	3	1	138	4	0	1	143	11	1	2	0	3	14	330
5:00 PM	13	161	0	0	0	174	2	0	0	0	1	2	2	149	4	0	1	155	4	0	1	0	3	5	336
Total	61	593	2	0	4	656	9	0	0	0	13	9	7	557	23	0	3	587	29	2	8	0	16	39	1291
Approach %	9.3	90.4	0.3	0.0	-	-	100.0	0.0	0.0	0.0	-	-	1.2	94.9	3.9	0.0	-	-	74.4	5.1	20.5	0.0	-	-	-
Total %	4.7	45.9	0.2	0.0	-	50.8	0.7	0.0	0.0	0.0	-	0.7	0.5	43.1	1.8	0.0	-	45.5	2.2	0.2	0.6	0.0	-	3.0	-
PHF	0.726	0.921	0.500	0.000	-	0.943	0.750	0.000	0.000	0.000	-	0.750	0.583	0.935	0.575	0.000	-	0.947	0.659	0.500	0.667	0.000	-	0.696	0.961
Lights	61	586	2	0	-	649	9	0	0	0	-	9	7	550	23	0	-	580	29	2	8	0	-	39	1277
% Lights	100.0	98.8	100.0	-	-	98.9	100.0	-	-	-	-	100.0	100.0	98.7	100.0	-	-	98.8	100.0	100.0	100.0	-	-	100.0	98.9
Other Vehicles	0	7	0	0	-	7	0	0	0	0	-	0	0	7	0	0	-	7	0	0	0	0	-	0	14
% Other Vehicles	0.0	1.2	0.0	-	-	1.1	0.0	-	-	-	-	0.0	0.0	1.3	0.0	-	-	1.2	0.0	0.0	0.0	-	-	0.0	1.1
Pedestrians	-	-	-	-	4	-	-	-	-	-	13	-	-	-	-	-	3	-	-	-	-	-	16	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



EXP Services Inc
602 Rothesay Avenue

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Count Name: University Avenue/Eden Street
Site Code:
Start Date: 07/14/2020
Page No: 9



Turning Movement Peak Hour Data Plot (4:15 PM)



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Eden Street
Site Code:
Start Date: 07/14/2020
Page No: 10



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Summer Street
Site Code:
Start Date: 07/14/2020
Page No: 1

Turning Movement Data

Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total	
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total		
7:00 AM	2	45	0	0	1	47	2	0	0	0	1	2	0	27	0	0	0	0	27	0	0	1	0	1	1	77
7:15 AM	0	61	2	0	0	63	2	0	0	0	0	2	0	43	1	0	0	0	44	1	2	0	0	4	3	112
7:30 AM	2	84	1	0	0	87	0	1	0	0	0	1	1	57	1	0	0	0	59	0	0	1	0	2	1	148
7:45 AM	0	113	0	0	1	113	2	0	0	0	0	2	1	63	0	0	0	0	64	0	1	0	0	2	1	180
Hourly Total	4	303	3	0	2	310	6	1	0	0	1	7	2	190	2	0	0	0	194	1	3	2	0	9	6	517
8:00 AM	0	112	2	0	0	114	1	1	0	0	0	2	0	44	0	0	0	0	44	0	0	0	0	2	0	160
8:15 AM	2	98	1	0	0	101	3	0	1	0	1	4	0	53	0	0	0	0	53	0	0	0	0	0	0	158
8:30 AM	0	89	1	0	3	90	1	0	0	0	0	1	0	66	1	0	0	0	67	0	1	0	0	2	1	159
8:45 AM	3	105	1	0	0	109	3	1	0	0	0	4	0	74	0	0	0	0	74	3	0	0	0	3	3	190
Hourly Total	5	404	5	0	3	414	8	2	1	0	1	11	0	237	1	0	0	0	238	3	1	0	0	7	4	667
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	8	134	0	0	2	142	4	0	0	0	1	4	2	126	4	0	1	1	132	2	0	3	0	2	5	283
11:45 AM	12	134	6	0	1	152	6	0	0	0	0	6	4	130	3	0	0	0	137	3	5	1	0	3	9	304
Hourly Total	20	268	6	0	3	294	10	0	0	0	1	10	6	256	7	0	1	1	269	5	5	4	0	5	14	587
12:00 PM	7	153	2	0	2	162	2	4	1	0	0	7	1	126	3	0	0	0	130	1	3	4	0	4	8	307
12:15 PM	11	157	3	0	4	171	4	2	2	0	0	8	0	136	4	0	0	0	140	5	3	6	0	4	14	333
12:30 PM	12	140	3	0	2	155	7	0	0	0	0	7	5	147	0	0	0	0	152	2	3	8	0	9	13	327
12:45 PM	9	164	5	0	3	178	5	0	1	1	0	7	2	140	5	0	0	0	147	6	0	7	0	6	13	345
Hourly Total	39	614	13	0	11	666	18	6	4	1	0	29	8	549	12	0	0	0	569	14	9	25	0	23	48	1312
1:00 PM	9	163	3	0	2	175	4	1	3	0	2	8	3	131	1	0	0	0	135	7	1	8	0	4	16	334
1:15 PM	6	152	2	0	2	160	5	1	2	0	1	8	3	148	6	0	0	0	157	4	1	2	0	4	7	332
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	15	315	5	0	4	335	9	2	5	0	3	16	6	279	7	0	0	0	292	11	2	10	0	8	23	666
4:00 PM	9	157	1	0	6	167	5	1	2	0	7	8	3	143	7	0	0	0	153	1	2	1	0	7	4	332
4:15 PM	12	139	4	0	8	155	6	1	0	0	2	7	1	126	0	0	0	0	127	6	0	3	0	1	9	298
4:30 PM	12	128	8	0	8	148	4	2	2	0	2	8	1	138	1	0	0	0	140	7	5	7	0	10	19	315
4:45 PM	8	139	9	0	8	156	9	0	1	0	2	10	1	131	3	0	0	0	135	5	0	3	0	0	8	309
Hourly Total	41	563	22	0	30	626	24	4	5	0	13	33	6	538	11	0	0	0	555	19	7	14	0	18	40	1254
5:00 PM	14	161	2	0	3	177	8	2	0	0	2	10	3	142	3	0	0	0	148	1	3	5	0	1	9	344
5:15 PM	8	126	6	0	2	140	3	1	0	0	2	4	1	105	5	0	0	0	111	5	1	6	0	3	12	267
5:30 PM	15	127	4	0	8	146	7	2	1	0	1	10	0	104	1	0	0	0	105	3	1	6	0	4	10	271
5:45 PM	13	124	4	0	4	141	4	0	0	0	0	4	4	97	5	0	1	1	106	5	2	7	0	6	14	265

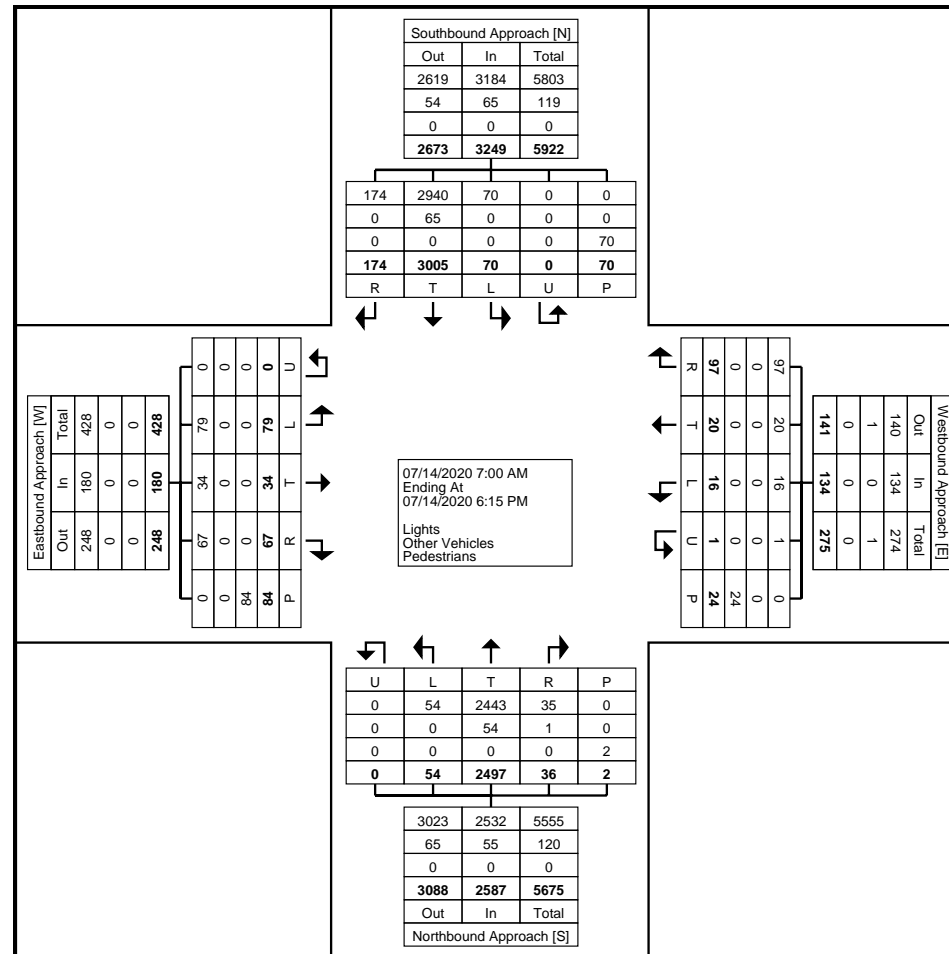
Hourly Total	50	538	16	0	17	604	22	5	1	0	5	28	8	448	14	0	1	470	14	7	24	0	14	45	1147
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	174	3005	70	0	70	3249	97	20	16	1	24	134	36	2497	54	0	2	2587	67	34	79	0	84	180	6150
Approach %	5.4	92.5	2.2	0.0	-	-	72.4	14.9	11.9	0.7	-	-	1.4	96.5	2.1	0.0	-	-	37.2	18.9	43.9	0.0	-	-	-
Total %	2.8	48.9	1.1	0.0	-	52.8	1.6	0.3	0.3	0.0	-	2.2	0.6	40.6	0.9	0.0	-	42.1	1.1	0.6	1.3	0.0	-	2.9	-
Lights	174	2940	70	0	-	3184	97	20	16	1	-	134	35	2443	54	0	-	2532	67	34	79	0	-	180	6030
% Lights	100.0	97.8	100.0	-	-	98.0	100.0	100.0	100.0	100.0	-	100.0	97.2	97.8	100.0	-	-	97.9	100.0	100.0	100.0	-	-	100.0	98.0
Other Vehicles	0	65	0	0	-	65	0	0	0	0	-	0	1	54	0	0	-	55	0	0	0	0	-	0	120
% Other Vehicles	0.0	2.2	0.0	-	-	2.0	0.0	0.0	0.0	0.0	-	0.0	2.8	2.2	0.0	-	-	2.1	0.0	0.0	0.0	-	-	0.0	2.0
Pedestrians	-	-	-	-	70	-	-	-	-	-	24	-	-	-	-	-	2	-	-	-	-	-	84	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



EXP Services Inc
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Count Name: University Avenue/Summer Street
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Start Date: 07/14/2020
Page No: 3



Turning Movement Data Plot



EXP Services Inc
602 Rothesay Avenue

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Count Name: University Avenue/Summer Street
Site Code:
Start Date: 07/14/2020
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

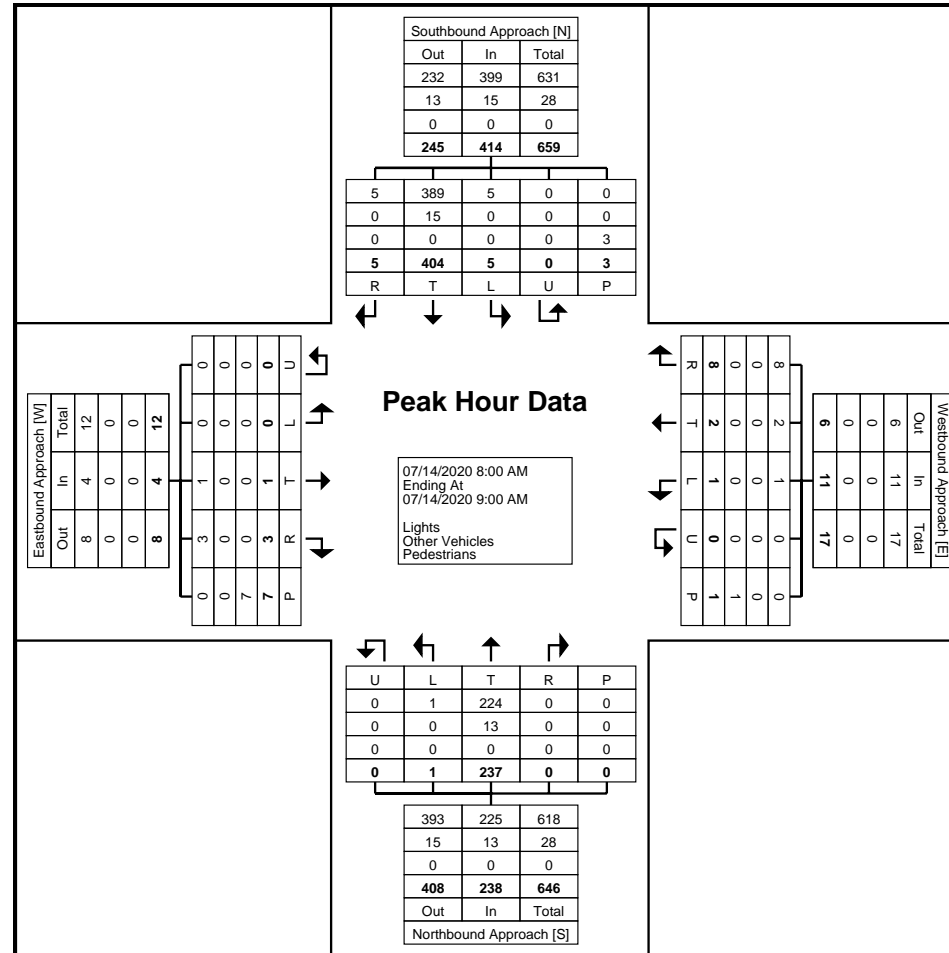
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total	
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total		
8:00 AM	0	112	2	0	0	114	1	1	0	0	0	2	0	44	0	0	0	0	44	0	0	0	0	2	0	160
8:15 AM	2	98	1	0	0	101	3	0	1	0	1	4	0	53	0	0	0	0	53	0	0	0	0	0	0	158
8:30 AM	0	89	1	0	3	90	1	0	0	0	0	1	0	66	1	0	0	0	67	0	1	0	0	2	1	159
8:45 AM	3	105	1	0	0	109	3	1	0	0	0	4	0	74	0	0	0	0	74	3	0	0	0	3	3	190
Total	5	404	5	0	3	414	8	2	1	0	1	11	0	237	1	0	0	0	238	3	1	0	0	7	4	667
Approach %	1.2	97.6	1.2	0.0	-	-	72.7	18.2	9.1	0.0	-	-	0.0	99.6	0.4	0.0	-	-	75.0	25.0	0.0	0.0	-	-	-	-
Total %	0.7	60.6	0.7	0.0	-	62.1	1.2	0.3	0.1	0.0	-	1.6	0.0	35.5	0.1	0.0	-	35.7	0.4	0.1	0.0	0.0	-	0.6	-	-
PHF	0.417	0.902	0.625	0.000	-	0.908	0.667	0.500	0.250	0.000	-	0.688	0.000	0.801	0.250	0.000	-	0.804	0.250	0.250	0.000	0.000	-	0.333	0.878	
Lights	5	389	5	0	-	399	8	2	1	0	-	11	0	224	1	0	-	225	3	1	0	0	-	4	639	
% Lights	100.0	96.3	100.0	-	-	96.4	100.0	100.0	100.0	-	-	100.0	-	94.5	100.0	-	-	94.5	100.0	100.0	-	-	-	-	100.0	95.8
Other Vehicles	0	15	0	0	-	15	0	0	0	0	-	0	0	13	0	0	-	13	0	0	0	0	-	0	0	28
% Other Vehicles	0.0	3.7	0.0	-	-	3.6	0.0	0.0	0.0	-	-	0.0	-	5.5	0.0	-	-	5.5	0.0	0.0	-	-	-	0.0	4.2	
Pedestrians	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	7	-	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue/Summer Street
Site Code:
Start Date: 07/14/2020
Page No: 5



Turning Movement Peak Hour Data Plot (8:00 AM)



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue/Summer Street
Site Code:
Start Date: 07/14/2020
Page No: 6

Turning Movement Peak Hour Data (12:15 PM)

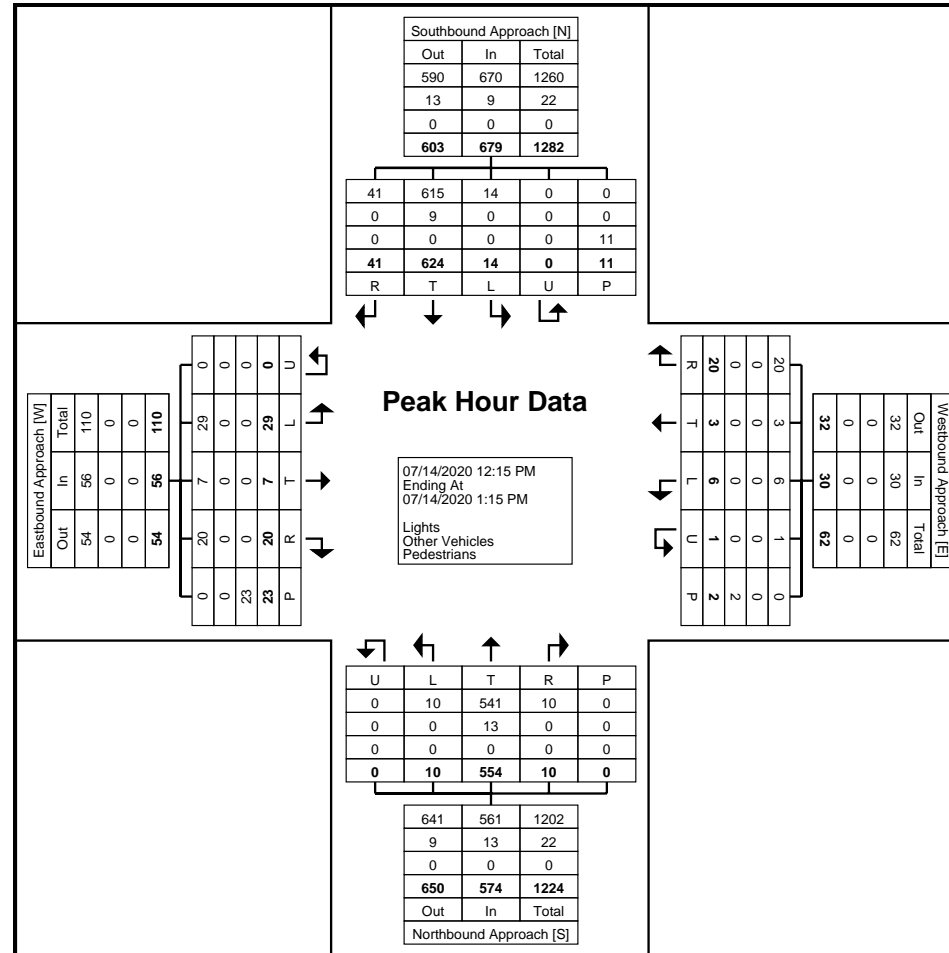
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
12:15 PM	11	157	3	0	4	171	4	2	2	0	0	8	0	136	4	0	0	140	5	3	6	0	4	14	333
12:30 PM	12	140	3	0	2	155	7	0	0	0	0	7	5	147	0	0	0	152	2	3	8	0	9	13	327
12:45 PM	9	164	5	0	3	178	5	0	1	1	0	7	2	140	5	0	0	147	6	0	7	0	6	13	345
1:00 PM	9	163	3	0	2	175	4	1	3	0	2	8	3	131	1	0	0	135	7	1	8	0	4	16	334
Total	41	624	14	0	11	679	20	3	6	1	2	30	10	554	10	0	0	574	20	7	29	0	23	56	1339
Approach %	6.0	91.9	2.1	0.0	-	-	66.7	10.0	20.0	3.3	-	-	1.7	96.5	1.7	0.0	-	-	35.7	12.5	51.8	0.0	-	-	-
Total %	3.1	46.6	1.0	0.0	-	50.7	1.5	0.2	0.4	0.1	-	2.2	0.7	41.4	0.7	0.0	-	42.9	1.5	0.5	2.2	0.0	-	4.2	-
PHF	0.854	0.951	0.700	0.000	-	0.954	0.714	0.375	0.500	0.250	-	0.938	0.500	0.942	0.500	0.000	-	0.944	0.714	0.583	0.906	0.000	-	0.875	0.970
Lights	41	615	14	0	-	670	20	3	6	1	-	30	10	541	10	0	-	561	20	7	29	0	-	56	1317
% Lights	100.0	98.6	100.0	-	-	98.7	100.0	100.0	100.0	100.0	-	100.0	100.0	97.7	100.0	-	-	97.7	100.0	100.0	100.0	-	-	100.0	98.4
Other Vehicles	0	9	0	0	-	9	0	0	0	0	-	0	0	13	0	0	-	13	0	0	0	0	-	0	22
% Other Vehicles	0.0	1.4	0.0	-	-	1.3	0.0	0.0	0.0	0.0	-	0.0	0.0	2.3	0.0	-	-	2.3	0.0	0.0	0.0	-	-	0.0	1.6
Pedestrians	-	-	-	-	11	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	23	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



EXP Services Inc
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Count Name: University Avenue/Summer Street
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Start Date: 07/14/2020
Page No: 7



Turning Movement Peak Hour Data Plot (12:15 PM)



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Summer Street
Site Code:
Start Date: 07/14/2020
Page No: 8

Turning Movement Peak Hour Data (4:15 PM)

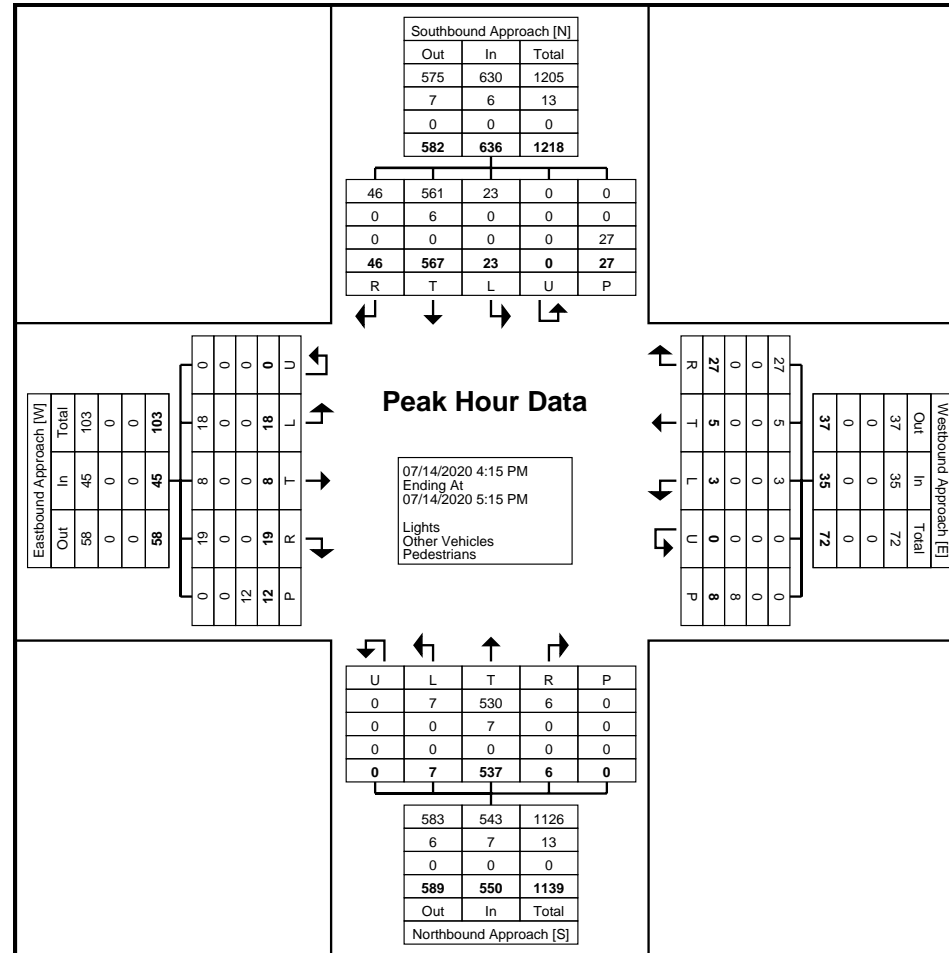
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:15 PM	12	139	4	0	8	155	6	1	0	0	2	7	1	126	0	0	0	127	6	0	3	0	1	9	298
4:30 PM	12	128	8	0	8	148	4	2	2	0	2	8	1	138	1	0	0	140	7	5	7	0	10	19	315
4:45 PM	8	139	9	0	8	156	9	0	1	0	2	10	1	131	3	0	0	135	5	0	3	0	0	8	309
5:00 PM	14	161	2	0	3	177	8	2	0	0	2	10	3	142	3	0	0	148	1	3	5	0	1	9	344
Total	46	567	23	0	27	636	27	5	3	0	8	35	6	537	7	0	0	550	19	8	18	0	12	45	1266
Approach %	7.2	89.2	3.6	0.0	-	-	77.1	14.3	8.6	0.0	-	-	1.1	97.6	1.3	0.0	-	-	42.2	17.8	40.0	0.0	-	-	-
Total %	3.6	44.8	1.8	0.0	-	50.2	2.1	0.4	0.2	0.0	-	2.8	0.5	42.4	0.6	0.0	-	43.4	1.5	0.6	1.4	0.0	-	3.6	-
PHF	0.821	0.880	0.639	0.000	-	0.898	0.750	0.625	0.375	0.000	-	0.875	0.500	0.945	0.583	0.000	-	0.929	0.679	0.400	0.643	0.000	-	0.592	0.920
Lights	46	561	23	0	-	630	27	5	3	0	-	35	6	530	7	0	-	543	19	8	18	0	-	45	1253
% Lights	100.0	98.9	100.0	-	-	99.1	100.0	100.0	100.0	-	-	100.0	100.0	98.7	100.0	-	-	98.7	100.0	100.0	100.0	-	-	100.0	99.0
Other Vehicles	0	6	0	0	-	6	0	0	0	0	-	0	0	7	0	0	-	7	0	0	0	0	-	0	13
% Other Vehicles	0.0	1.1	0.0	-	-	0.9	0.0	0.0	0.0	-	-	0.0	0.0	1.3	0.0	-	-	1.3	0.0	0.0	0.0	-	-	0.0	1.0
Pedestrians	-	-	-	-	27	-	-	-	-	-	8	-	-	-	-	-	0	-	-	-	-	-	12	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



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Count Name: University Avenue/Summer Street
Site Code:
Start Date: 07/14/2020
Page No: 9



Turning Movement Peak Hour Data Plot (4:15 PM)



EXP Services Inc
602 Rothesay Avenue

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Count Name: University Avenue/Summer Street
Site Code:
Start Date: 07/14/2020
Page No: 10



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Pond Street
Site Code:
Start Date: 07/14/2020
Page No: 1

Turning Movement Data

Start Time	Southbound Approach					Northbound Approach					Eastbound Approach					Int. Total
	Southbound					Northbound					Eastbound					
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
7:00 AM	4	45	0	0	49	26	0	0	0	26	3	1	0	1	4	79
7:15 AM	5	53	0	0	58	46	0	0	1	46	1	0	0	2	1	105
7:30 AM	4	88	0	1	92	61	1	0	0	62	4	1	0	4	5	159
7:45 AM	9	105	0	0	114	61	3	1	3	65	2	1	0	1	3	182
Hourly Total	22	291	0	1	313	194	4	1	4	199	10	3	0	8	13	525
8:00 AM	9	101	0	0	110	41	1	0	0	42	4	2	0	2	6	158
8:15 AM	5	90	0	0	95	49	0	0	0	49	5	4	0	0	9	153
8:30 AM	4	93	0	0	97	68	3	0	0	71	3	5	0	0	8	176
8:45 AM	5	96	0	1	101	61	4	0	0	65	3	6	0	2	9	175
Hourly Total	23	380	0	1	403	219	8	0	0	227	15	17	0	4	32	662
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	26	117	0	0	143	118	4	2	1	124	12	13	0	1	25	292
11:45 AM	20	116	0	0	136	119	6	1	0	126	12	11	0	3	23	285
Hourly Total	46	233	0	0	279	237	10	3	1	250	24	24	0	4	48	577
12:00 PM	28	122	2	1	152	124	5	1	0	130	11	10	0	3	21	303
12:15 PM	24	138	0	0	162	123	3	1	0	127	7	19	0	3	26	315
12:30 PM	21	125	1	1	147	143	5	4	0	152	8	12	0	6	20	319
12:45 PM	29	139	2	0	170	131	9	2	0	142	11	17	0	3	28	340
Hourly Total	102	524	5	2	631	521	22	8	0	551	37	58	0	15	95	1277
1:00 PM	35	133	0	0	168	120	3	1	0	124	13	19	0	1	32	324
1:15 PM	29	128	0	0	157	146	4	1	0	151	11	9	0	3	20	328
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	64	261	0	0	325	266	7	2	0	275	24	28	0	4	52	652
4:00 PM	18	141	0	2	159	143	11	3	0	157	8	15	0	10	23	339
4:15 PM	21	123	1	0	145	127	6	0	0	133	13	12	0	5	25	303
4:30 PM	19	114	0	0	133	112	10	0	0	122	14	14	0	3	28	283
4:45 PM	28	128	0	0	156	117	6	0	0	123	12	19	0	1	31	310
Hourly Total	86	506	1	2	593	499	33	3	0	535	47	60	0	19	107	1235
5:00 PM	15	138	1	1	154	141	9	3	0	153	11	12	0	0	23	330
5:15 PM	19	114	0	0	133	88	3	0	0	91	12	14	0	1	26	250
5:30 PM	16	115	1	0	132	98	6	1	1	105	9	7	0	2	16	253
5:45 PM	22	111	0	2	133	99	3	0	0	102	3	9	1	6	13	248
Hourly Total	72	478	2	3	552	426	21	4	1	451	35	42	1	9	78	1081

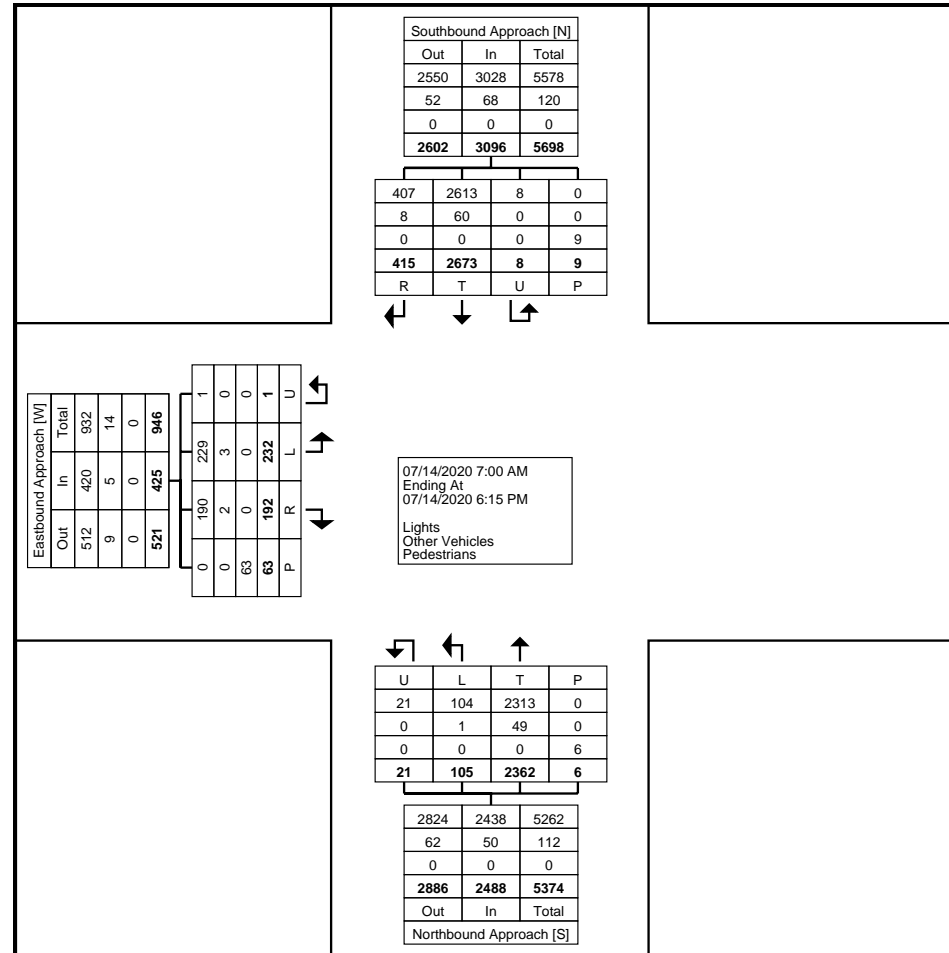
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	415	2673	8	9	3096	2362	105	21	6	2488	192	232	1	63	425	6009
Approach %	13.4	86.3	0.3	-	-	94.9	4.2	0.8	-	-	45.2	54.6	0.2	-	-	-
Total %	6.9	44.5	0.1	-	51.5	39.3	1.7	0.3	-	41.4	3.2	3.9	0.0	-	7.1	-
Lights	407	2613	8	-	3028	2313	104	21	-	2438	190	229	1	-	420	5886
% Lights	98.1	97.8	100.0	-	97.8	97.9	99.0	100.0	-	98.0	99.0	98.7	100.0	-	98.8	98.0
Other Vehicles	8	60	0	-	68	49	1	0	-	50	2	3	0	-	5	123
% Other Vehicles	1.9	2.2	0.0	-	2.2	2.1	1.0	0.0	-	2.0	1.0	1.3	0.0	-	1.2	2.0
Pedestrians	-	-	-	9	-	-	-	-	6	-	-	-	-	63	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Pond Street
Site Code:
Start Date: 07/14/2020
Page No: 3



Turning Movement Data Plot



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Pond Street
Site Code:
Start Date: 07/14/2020
Page No: 4

Turning Movement Peak Hour Data (7:45 AM)

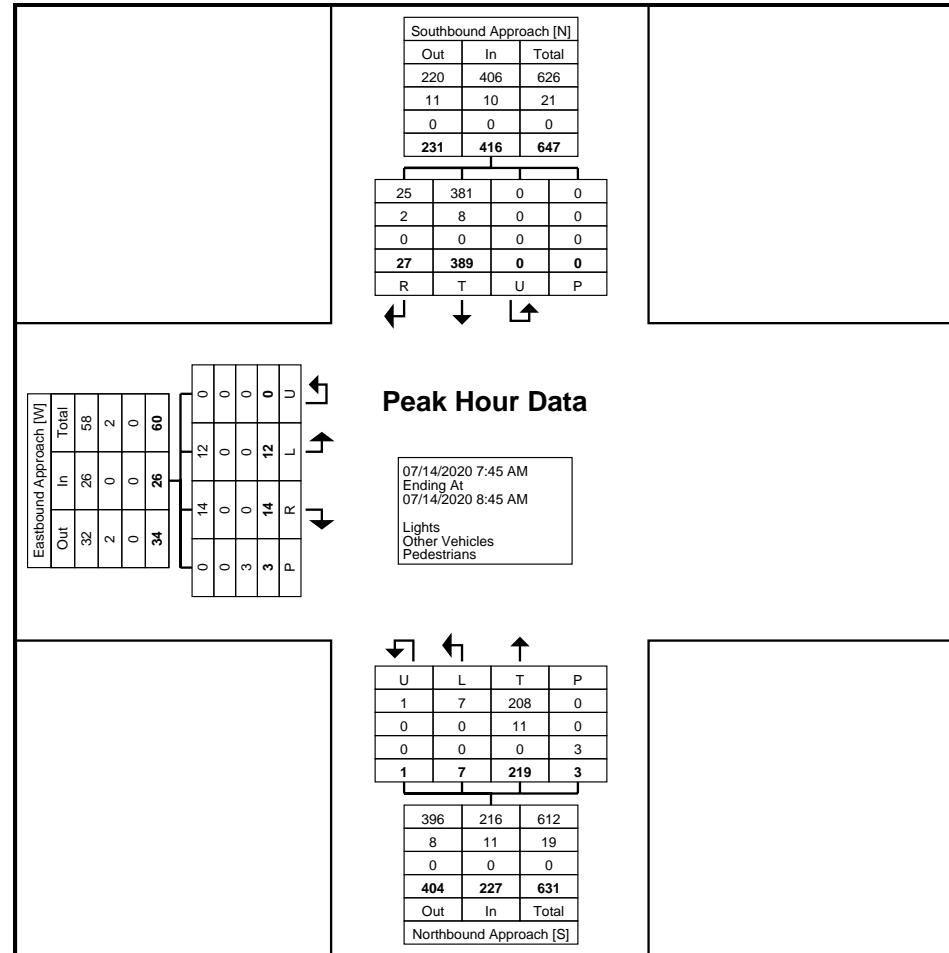
Start Time	Southbound Approach					Northbound Approach					Eastbound Approach					Int. Total
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
7:45 AM	9	105	0	0	114	61	3	1	3	65	2	1	0	1	3	182
8:00 AM	9	101	0	0	110	41	1	0	0	42	4	2	0	2	6	158
8:15 AM	5	90	0	0	95	49	0	0	0	49	5	4	0	0	9	153
8:30 AM	4	93	0	0	97	68	3	0	0	71	3	5	0	0	8	176
Total	27	389	0	0	416	219	7	1	3	227	14	12	0	3	26	669
Approach %	6.5	93.5	0.0	-	-	96.5	3.1	0.4	-	-	53.8	46.2	0.0	-	-	-
Total %	4.0	58.1	0.0	-	62.2	32.7	1.0	0.1	-	33.9	2.1	1.8	0.0	-	3.9	-
PHF	0.750	0.926	0.000	-	0.912	0.805	0.583	0.250	-	0.799	0.700	0.600	0.000	-	0.722	0.919
Lights	25	381	0	-	406	208	7	1	-	216	14	12	0	-	26	648
% Lights	92.6	97.9	-	-	97.6	95.0	100.0	100.0	-	95.2	100.0	100.0	-	-	100.0	96.9
Other Vehicles	2	8	0	-	10	11	0	0	-	11	0	0	0	-	0	21
% Other Vehicles	7.4	2.1	-	-	2.4	5.0	0.0	0.0	-	4.8	0.0	0.0	-	-	0.0	3.1
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-



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Count Name: University Avenue/Pond Street
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Page No: 5



Turning Movement Peak Hour Data Plot (7:45 AM)



EXP Services Inc
602 Rothesay Avenue

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Count Name: University Avenue/Pond Street
Site Code:
Start Date: 07/14/2020
Page No: 6

Turning Movement Peak Hour Data (12:30 PM)

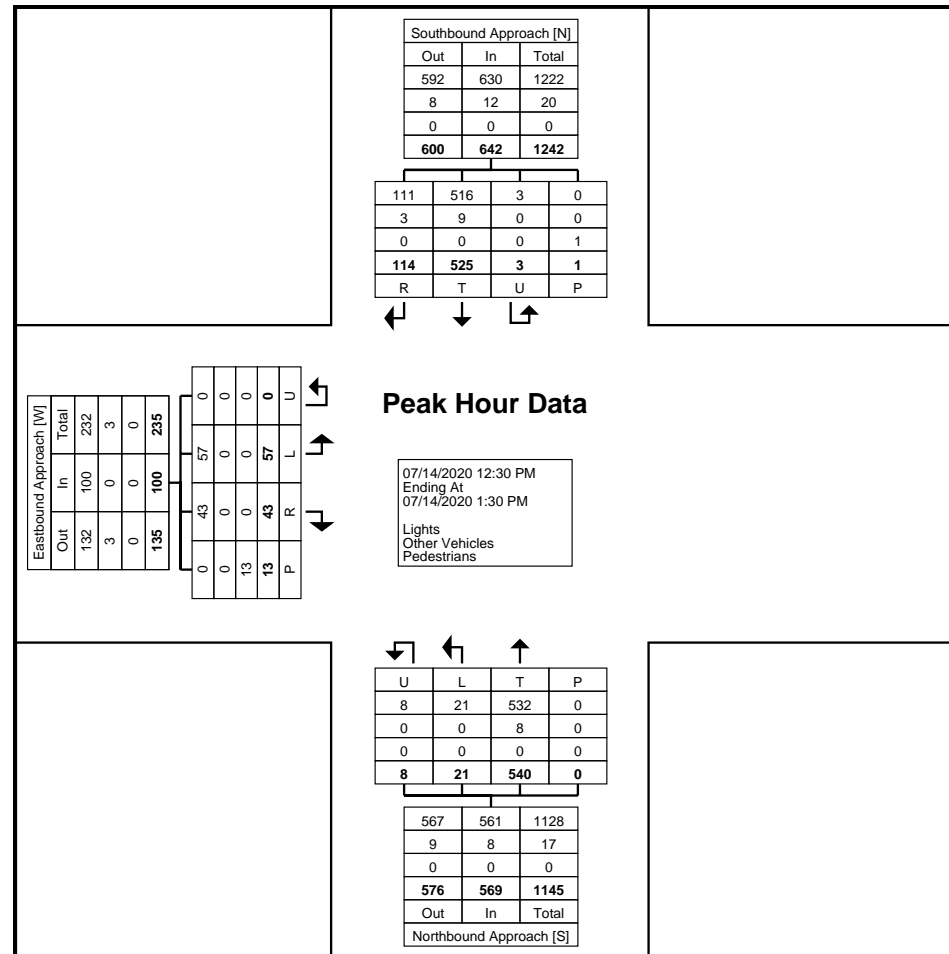
Start Time	Southbound Approach					Northbound Approach					Eastbound Approach					Int. Total
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
12:30 PM	21	125	1	1	147	143	5	4	0	152	8	12	0	6	20	319
12:45 PM	29	139	2	0	170	131	9	2	0	142	11	17	0	3	28	340
1:00 PM	35	133	0	0	168	120	3	1	0	124	13	19	0	1	32	324
1:15 PM	29	128	0	0	157	146	4	1	0	151	11	9	0	3	20	328
Total	114	525	3	1	642	540	21	8	0	569	43	57	0	13	100	1311
Approach %	17.8	81.8	0.5	-	-	94.9	3.7	1.4	-	-	43.0	57.0	0.0	-	-	-
Total %	8.7	40.0	0.2	-	49.0	41.2	1.6	0.6	-	43.4	3.3	4.3	0.0	-	7.6	-
PHF	0.814	0.944	0.375	-	0.944	0.925	0.583	0.500	-	0.936	0.827	0.750	0.000	-	0.781	0.964
Lights	111	516	3	-	630	532	21	8	-	561	43	57	0	-	100	1291
% Lights	97.4	98.3	100.0	-	98.1	98.5	100.0	100.0	-	98.6	100.0	100.0	-	-	100.0	98.5
Other Vehicles	3	9	0	-	12	8	0	0	-	8	0	0	0	-	0	20
% Other Vehicles	2.6	1.7	0.0	-	1.9	1.5	0.0	0.0	-	1.4	0.0	0.0	-	-	0.0	1.5
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	13	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-



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Page No: 7



Turning Movement Peak Hour Data Plot (12:30 PM)



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Pond Street
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Page No: 8

Turning Movement Peak Hour Data (4:00 PM)

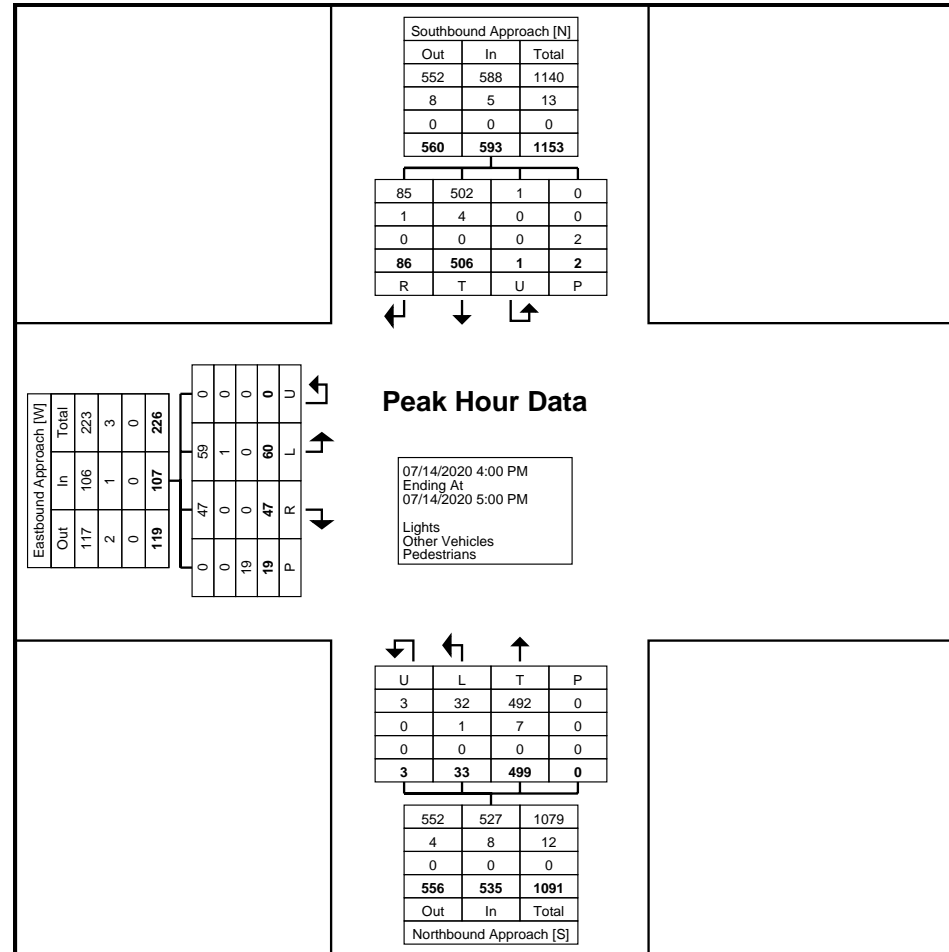
Start Time	Southbound Approach					Northbound Approach					Eastbound Approach					Int. Total
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
4:00 PM	18	141	0	2	159	143	11	3	0	157	8	15	0	10	23	339
4:15 PM	21	123	1	0	145	127	6	0	0	133	13	12	0	5	25	303
4:30 PM	19	114	0	0	133	112	10	0	0	122	14	14	0	3	28	283
4:45 PM	28	128	0	0	156	117	6	0	0	123	12	19	0	1	31	310
Total	86	506	1	2	593	499	33	3	0	535	47	60	0	19	107	1235
Approach %	14.5	85.3	0.2	-	-	93.3	6.2	0.6	-	-	43.9	56.1	0.0	-	-	-
Total %	7.0	41.0	0.1	-	48.0	40.4	2.7	0.2	-	43.3	3.8	4.9	0.0	-	8.7	-
PHF	0.768	0.897	0.250	-	0.932	0.872	0.750	0.250	-	0.852	0.839	0.789	0.000	-	0.863	0.911
Lights	85	502	1	-	588	492	32	3	-	527	47	59	0	-	106	1221
% Lights	98.8	99.2	100.0	-	99.2	98.6	97.0	100.0	-	98.5	100.0	98.3	-	-	99.1	98.9
Other Vehicles	1	4	0	-	5	7	1	0	-	8	0	1	0	-	1	14
% Other Vehicles	1.2	0.8	0.0	-	0.8	1.4	3.0	0.0	-	1.5	0.0	1.7	-	-	0.9	1.1
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	19	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue/Pond Street
Site Code:
Start Date: 07/14/2020
Page No: 9



Turning Movement Peak Hour Data Plot (4:00 PM)



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Pond Street
Site Code:
Start Date: 07/14/2020
Page No: 10



EXP Services Inc
602 Rothesay Avenue

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Count Name: University Avenue/Lincoln
Street/Gerald Street
Site Code:
Start Date: 07/15/2020
Page No: 1

Turning Movement Data

Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	3	40	2	0	0	45	3	0	0	0	0	3	1	28	0	0	0	29	0	0	0	0	0	0	77
7:15 AM	1	54	1	0	2	56	2	1	0	0	0	3	0	41	2	0	0	43	1	0	1	0	2	2	104
7:30 AM	4	62	1	0	0	67	6	2	0	0	0	8	0	39	3	0	0	42	3	0	2	0	2	5	122
7:45 AM	9	86	0	0	3	95	5	2	1	0	0	8	0	61	0	0	1	61	2	2	1	0	1	5	169
Hourly Total	17	242	4	0	5	263	16	5	1	0	0	22	1	169	5	0	1	175	6	2	4	0	5	12	472
8:00 AM	5	96	2	0	0	103	5	0	0	0	0	5	1	41	2	0	0	44	2	0	1	0	0	3	155
8:15 AM	3	93	1	0	0	97	4	1	0	0	1	5	1	63	1	0	0	65	2	0	1	0	1	3	170
8:30 AM	2	69	2	0	0	73	5	0	1	0	1	6	0	56	3	0	0	59	2	0	4	0	1	6	144
8:45 AM	9	85	6	0	2	100	2	2	2	0	2	6	1	61	3	0	0	65	2	0	5	0	4	7	178
Hourly Total	19	343	11	0	2	373	16	3	3	0	4	22	3	221	9	0	0	233	8	0	11	0	6	19	647
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	13	101	10	0	5	124	11	1	1	0	4	13	0	95	7	0	0	102	7	0	5	0	5	12	251
11:45 AM	12	103	8	0	9	123	11	2	1	0	1	14	1	111	7	0	0	119	14	4	5	0	7	23	279
Hourly Total	25	204	18	0	14	247	22	3	2	0	5	27	1	206	14	0	0	221	21	4	10	0	12	35	530
12:00 PM	12	142	13	0	6	167	14	3	5	0	2	22	4	118	7	0	1	129	11	3	7	0	3	21	339
12:15 PM	15	120	13	0	5	148	17	1	1	0	2	19	1	116	6	0	0	123	11	2	7	0	5	20	310
12:30 PM	18	120	20	0	7	158	17	3	2	0	0	22	2	111	8	0	0	121	16	1	10	0	6	27	328
12:45 PM	21	115	9	0	4	145	9	1	1	0	3	11	1	103	8	0	0	112	14	1	7	0	5	22	290
Hourly Total	66	497	55	0	22	618	57	8	9	0	7	74	8	448	29	0	1	485	52	7	31	0	19	90	1267
1:00 PM	13	127	14	0	1	154	10	0	0	0	0	10	4	117	8	0	0	129	12	2	8	0	1	22	315
1:15 PM	8	106	11	0	0	125	12	1	1	0	0	14	4	117	8	0	0	129	11	0	11	0	3	22	290
1:30 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	21	234	25	0	1	280	22	1	1	0	0	24	8	235	16	0	0	259	23	2	19	0	4	44	607
4:00 PM	10	111	8	0	2	129	13	1	0	0	0	14	1	119	3	0	0	123	12	0	8	0	2	20	286
4:15 PM	14	133	17	0	2	164	15	0	0	0	1	15	5	127	6	0	0	138	7	0	7	0	2	14	331
4:30 PM	12	117	13	0	4	142	9	0	1	0	6	10	4	110	4	0	0	118	16	1	6	0	4	23	293
4:45 PM	10	101	18	0	9	129	13	2	0	0	2	15	2	97	8	0	1	107	13	1	8	0	5	22	273
Hourly Total	46	462	56	0	17	564	50	3	1	0	9	54	12	453	21	0	1	486	48	2	29	0	13	79	1183
5:00 PM	8	128	16	0	3	152	25	0	3	0	1	28	2	119	14	0	0	135	14	4	7	0	2	25	340
5:15 PM	6	131	8	0	4	145	8	4	1	0	1	13	2	101	4	0	0	107	7	3	13	0	7	23	288
5:30 PM	5	119	7	0	6	131	2	1	1	0	4	4	4	89	3	0	2	96	5	0	7	0	6	12	243
5:45 PM	1	77	10	0	4	88	7	0	2	0	6	9	2	74	3	0	0	79	1	2	5	0	10	8	184

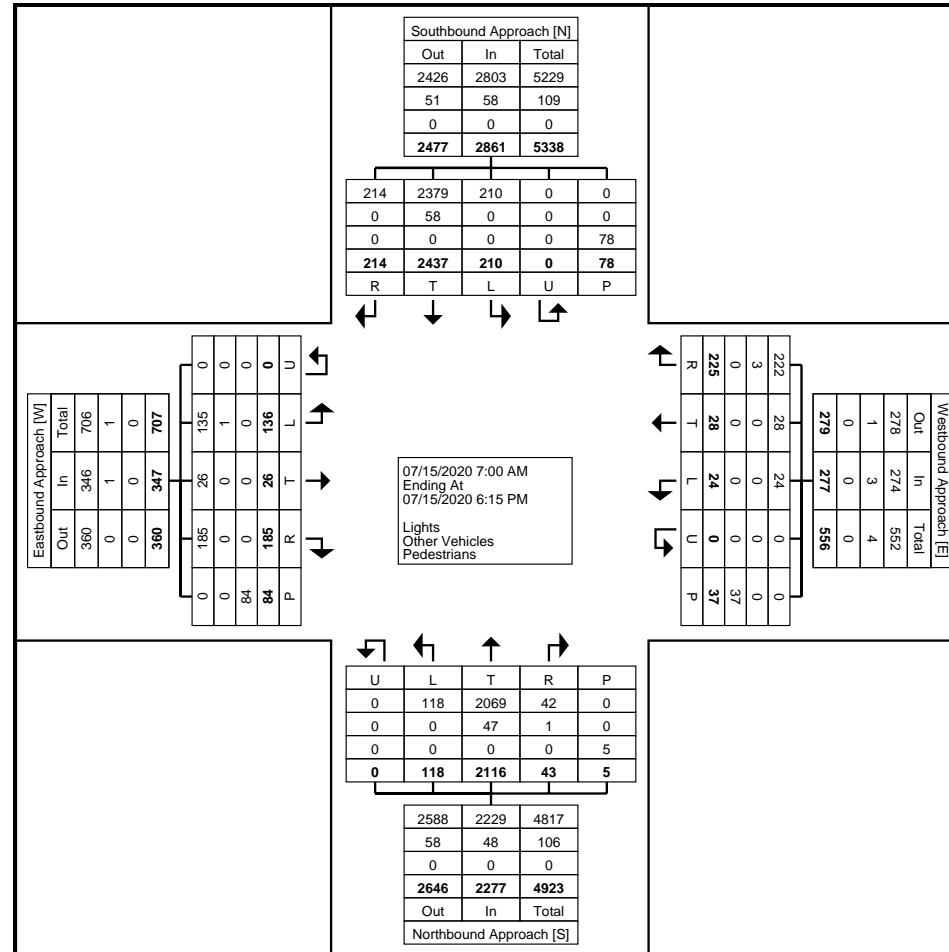
Hourly Total	20	455	41	0	17	516	42	5	7	0	12	54	10	383	24	0	2	417	27	9	32	0	25	68	1055
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1
Grand Total	214	2437	210	0	78	2861	225	28	24	0	37	277	43	2116	118	0	5	2277	185	26	136	0	84	347	5762
Approach %	7.5	85.2	7.3	0.0	-	-	81.2	10.1	8.7	0.0	-	-	1.9	92.9	5.2	0.0	-	-	53.3	7.5	39.2	0.0	-	-	-
Total %	3.7	42.3	3.6	0.0	-	49.7	3.9	0.5	0.4	0.0	-	4.8	0.7	36.7	2.0	0.0	-	39.5	3.2	0.5	2.4	0.0	-	6.0	-
Lights	214	2379	210	0	-	2803	222	28	24	0	-	274	42	2069	118	0	-	2229	185	26	135	0	-	346	5652
% Lights	100.0	97.6	100.0	-	-	98.0	98.7	100.0	100.0	-	-	98.9	97.7	97.8	100.0	-	-	97.9	100.0	100.0	99.3	-	-	99.7	98.1
Other Vehicles	0	58	0	0	-	58	3	0	0	0	-	3	1	47	0	0	-	48	0	0	1	0	-	1	110
% Other Vehicles	0.0	2.4	0.0	-	-	2.0	1.3	0.0	0.0	-	-	1.1	2.3	2.2	0.0	-	-	2.1	0.0	0.0	0.7	-	-	0.3	1.9
Pedestrians	-	-	-	-	78	-	-	-	-	-	37	-	-	-	-	-	5	-	-	-	-	-	84	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



EXP Services Inc
602 Rothesay Avenue

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Count Name: University Avenue/Lincoln
Street/Gerald Street
Site Code:
Start Date: 07/15/2020
Page No: 3



Turning Movement Data Plot



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Lincoln
Street/Gerald Street
Site Code:
Start Date: 07/15/2020
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
8:00 AM	5	96	2	0	0	103	5	0	0	0	0	5	1	41	2	0	0	44	2	0	1	0	0	3	155
8:15 AM	3	93	1	0	0	97	4	1	0	0	1	5	1	63	1	0	0	65	2	0	1	0	1	3	170
8:30 AM	2	69	2	0	0	73	5	0	1	0	1	6	0	56	3	0	0	59	2	0	4	0	1	6	144
8:45 AM	9	85	6	0	2	100	2	2	2	0	2	6	1	61	3	0	0	65	2	0	5	0	4	7	178
Total	19	343	11	0	2	373	16	3	3	0	4	22	3	221	9	0	0	233	8	0	11	0	6	19	647
Approach %	5.1	92.0	2.9	0.0	-	-	72.7	13.6	13.6	0.0	-	-	1.3	94.8	3.9	0.0	-	-	42.1	0.0	57.9	0.0	-	-	-
Total %	2.9	53.0	1.7	0.0	-	57.7	2.5	0.5	0.5	0.0	-	3.4	0.5	34.2	1.4	0.0	-	36.0	1.2	0.0	1.7	0.0	-	2.9	-
PHF	0.528	0.893	0.458	0.000	-	0.905	0.800	0.375	0.375	0.000	-	0.917	0.750	0.877	0.750	0.000	-	0.896	1.000	0.000	0.550	0.000	-	0.679	0.909
Lights	19	330	11	0	-	360	16	3	3	0	-	22	3	212	9	0	-	224	8	0	10	0	-	18	624
% Lights	100.0	96.2	100.0	-	-	96.5	100.0	100.0	100.0	-	-	100.0	100.0	95.9	100.0	-	-	96.1	100.0	-	90.9	-	-	94.7	96.4
Other Vehicles	0	13	0	0	-	13	0	0	0	0	-	0	0	9	0	0	-	9	0	0	1	0	-	1	23
% Other Vehicles	0.0	3.8	0.0	-	-	3.5	0.0	0.0	0.0	-	-	0.0	0.0	4.1	0.0	-	-	3.9	0.0	-	9.1	-	-	5.3	3.6
Pedestrians	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



EXP Services Inc
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Count Name: University Avenue/Lincoln
Street/Gerald Street
Site Code:
Start Date: 07/15/2020
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

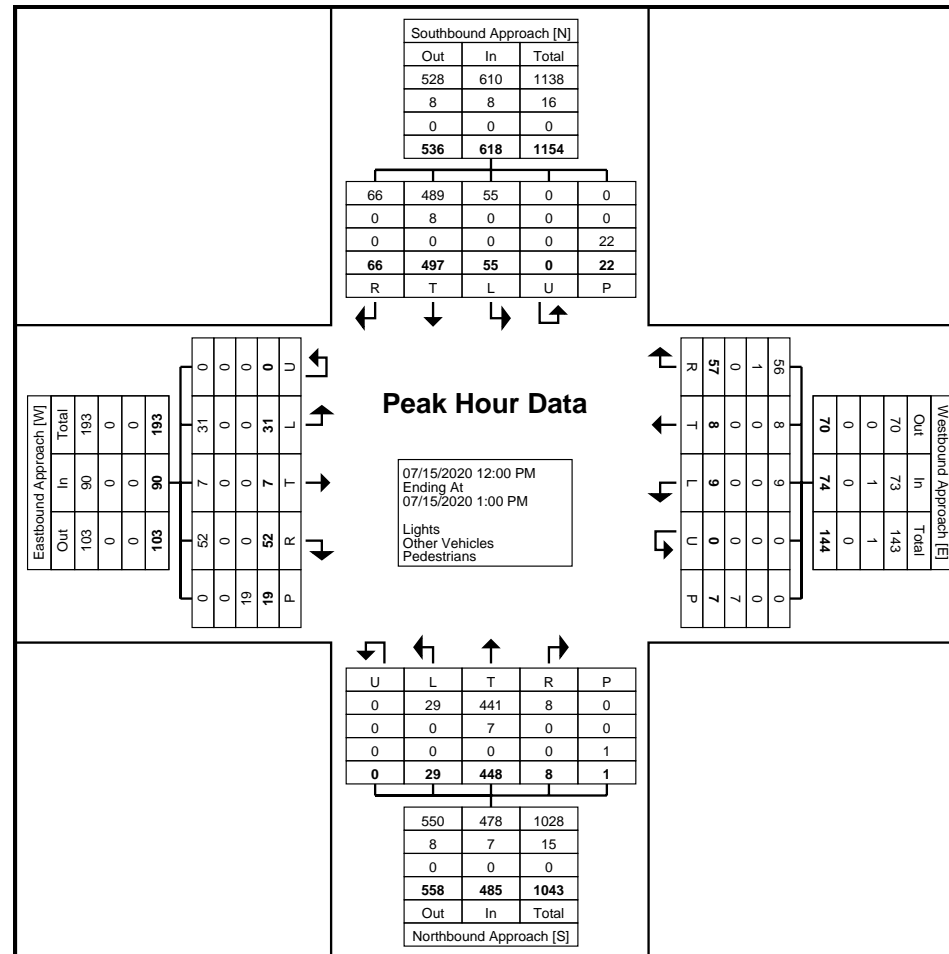
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
12:00 PM	12	142	13	0	6	167	14	3	5	0	2	22	4	118	7	0	1	129	11	3	7	0	3	21	339
12:15 PM	15	120	13	0	5	148	17	1	1	0	2	19	1	116	6	0	0	123	11	2	7	0	5	20	310
12:30 PM	18	120	20	0	7	158	17	3	2	0	0	22	2	111	8	0	0	121	16	1	10	0	6	27	328
12:45 PM	21	115	9	0	4	145	9	1	1	0	3	11	1	103	8	0	0	112	14	1	7	0	5	22	290
Total	66	497	55	0	22	618	57	8	9	0	7	74	8	448	29	0	1	485	52	7	31	0	19	90	1267
Approach %	10.7	80.4	8.9	0.0	-	-	77.0	10.8	12.2	0.0	-	-	1.6	92.4	6.0	0.0	-	-	57.8	7.8	34.4	0.0	-	-	-
Total %	5.2	39.2	4.3	0.0	-	48.8	4.5	0.6	0.7	0.0	-	5.8	0.6	35.4	2.3	0.0	-	38.3	4.1	0.6	2.4	0.0	-	7.1	-
PHF	0.786	0.875	0.688	0.000	-	0.925	0.838	0.667	0.450	0.000	-	0.841	0.500	0.949	0.906	0.000	-	0.940	0.813	0.583	0.775	0.000	-	0.833	0.934
Lights	66	489	55	0	-	610	56	8	9	0	-	73	8	441	29	0	-	478	52	7	31	0	-	90	1251
% Lights	100.0	98.4	100.0	-	-	98.7	98.2	100.0	100.0	-	-	98.6	100.0	98.4	100.0	-	-	98.6	100.0	100.0	100.0	-	-	100.0	98.7
Other Vehicles	0	8	0	0	-	8	1	0	0	0	-	1	0	7	0	0	-	7	0	0	0	0	-	0	16
% Other Vehicles	0.0	1.6	0.0	-	-	1.3	1.8	0.0	0.0	-	-	1.4	0.0	1.6	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	1.3
Pedestrians	-	-	-	-	22	-	-	-	-	-	7	-	-	-	-	-	1	-	-	-	-	-	19	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Count Name: University Avenue/Lincoln
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Site Code:
Start Date: 07/15/2020
Page No: 7



Turning Movement Peak Hour Data Plot (12:00 PM)



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Lincoln
Street/Gerald Street
Site Code:
Start Date: 07/15/2020
Page No: 8

Turning Movement Peak Hour Data (4:15 PM)

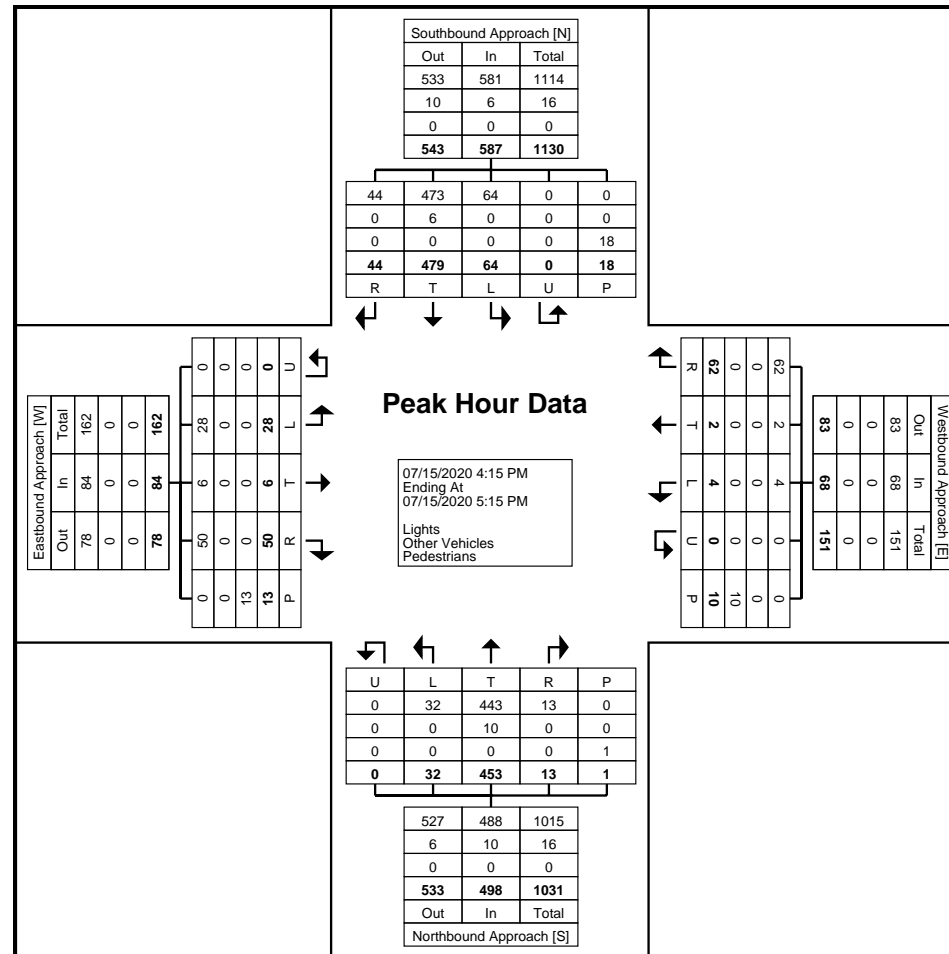
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:15 PM	14	133	17	0	2	164	15	0	0	0	1	15	5	127	6	0	0	138	7	0	7	0	2	14	331
4:30 PM	12	117	13	0	4	142	9	0	1	0	6	10	4	110	4	0	0	118	16	1	6	0	4	23	293
4:45 PM	10	101	18	0	9	129	13	2	0	0	2	15	2	97	8	0	1	107	13	1	8	0	5	22	273
5:00 PM	8	128	16	0	3	152	25	0	3	0	1	28	2	119	14	0	0	135	14	4	7	0	2	25	340
Total	44	479	64	0	18	587	62	2	4	0	10	68	13	453	32	0	1	498	50	6	28	0	13	84	1237
Approach %	7.5	81.6	10.9	0.0	-	-	91.2	2.9	5.9	0.0	-	-	2.6	91.0	6.4	0.0	-	-	59.5	7.1	33.3	0.0	-	-	-
Total %	3.6	38.7	5.2	0.0	-	47.5	5.0	0.2	0.3	0.0	-	5.5	1.1	36.6	2.6	0.0	-	40.3	4.0	0.5	2.3	0.0	-	6.8	-
PHF	0.786	0.900	0.889	0.000	-	0.895	0.620	0.250	0.333	0.000	-	0.607	0.650	0.892	0.571	0.000	-	0.902	0.781	0.375	0.875	0.000	-	0.840	0.910
Lights	44	473	64	0	-	581	62	2	4	0	-	68	13	443	32	0	-	488	50	6	28	0	-	84	1221
% Lights	100.0	98.7	100.0	-	-	99.0	100.0	100.0	100.0	-	-	100.0	100.0	97.8	100.0	-	-	98.0	100.0	100.0	100.0	-	-	100.0	98.7
Other Vehicles	0	6	0	0	-	6	0	0	0	0	-	0	0	10	0	0	-	10	0	0	0	0	-	0	16
% Other Vehicles	0.0	1.3	0.0	-	-	1.0	0.0	0.0	0.0	-	-	0.0	0.0	2.2	0.0	-	-	2.0	0.0	0.0	0.0	-	-	0.0	1.3
Pedestrians	-	-	-	-	18	-	-	-	-	-	10	-	-	-	-	-	1	-	-	-	-	-	13	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Count Name: University Avenue/Lincoln
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Page No: 9



Turning Movement Peak Hour Data Plot (4:15 PM)



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Page No: 10



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue/Connolly Street
Site Code:
Start Date: 07/15/2020
Page No: 1

Turning Movement Data

Start Time	Southbound Approach					Northbound Approach					Eastbound Approach					Int. Total
	Southbound					Northbound					Eastbound					
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
7:00 AM	0	38	0	0	38	30	0	0	0	30	0	0	0	0	0	68
7:15 AM	1	57	0	0	58	44	0	0	0	44	0	0	0	0	0	102
7:30 AM	2	63	0	0	65	43	2	0	0	45	0	0	0	2	0	110
7:45 AM	3	82	0	0	85	61	2	0	0	63	0	0	0	0	0	148
Hourly Total	6	240	0	0	246	178	4	0	0	182	0	0	0	2	0	428
8:00 AM	2	94	0	0	96	44	2	0	0	46	0	0	0	0	0	142
8:15 AM	2	96	0	0	98	65	3	0	0	68	0	0	0	1	0	166
8:30 AM	2	71	0	1	73	59	2	0	0	61	0	0	0	1	0	134
8:45 AM	2	85	0	0	87	66	1	0	0	67	0	0	0	2	0	154
Hourly Total	8	346	0	1	354	234	8	0	0	242	0	0	0	4	0	596
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	2	106	0	0	108	99	1	0	0	100	0	0	0	5	0	208
11:45 AM	2	108	0	0	110	126	3	0	0	129	1	0	0	7	1	240
Hourly Total	4	214	0	0	218	225	4	0	0	229	1	0	0	12	1	448
12:00 PM	3	158	0	0	161	131	1	0	0	132	0	0	0	4	0	293
12:15 PM	6	122	0	0	128	128	3	0	0	131	0	0	0	8	0	259
12:30 PM	3	132	0	0	135	123	0	0	0	123	0	0	0	5	0	258
12:45 PM	2	132	0	0	134	116	3	0	1	119	0	0	0	7	0	253
Hourly Total	14	544	0	0	558	498	7	0	1	505	0	0	0	24	0	1063
1:00 PM	4	133	0	0	137	129	4	0	0	133	0	0	0	6	0	270
1:15 PM	4	114	0	0	118	131	2	0	0	133	0	0	0	1	0	251
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	8	247	0	0	255	260	6	0	0	266	0	0	0	7	0	521
4:00 PM	2	122	0	0	124	123	1	0	0	124	0	0	0	5	0	248
4:15 PM	3	132	0	0	135	144	2	0	0	146	0	0	0	5	0	281
4:30 PM	4	130	0	0	134	124	2	0	0	126	0	0	0	6	0	260
4:45 PM	9	105	0	0	114	108	0	0	0	108	0	0	0	6	0	222
Hourly Total	18	489	0	0	507	499	5	0	0	504	0	0	0	22	0	1011
5:00 PM	5	137	0	0	142	134	0	0	0	134	0	0	0	2	0	276
5:15 PM	3	134	0	0	137	108	0	0	0	108	0	0	0	11	0	245
5:30 PM	2	123	0	0	125	99	0	0	0	99	0	0	0	4	0	224
5:45 PM	4	83	0	0	87	81	0	0	0	81	0	0	1	7	1	169
Hourly Total	14	477	0	0	491	422	0	0	0	422	0	0	1	24	1	914

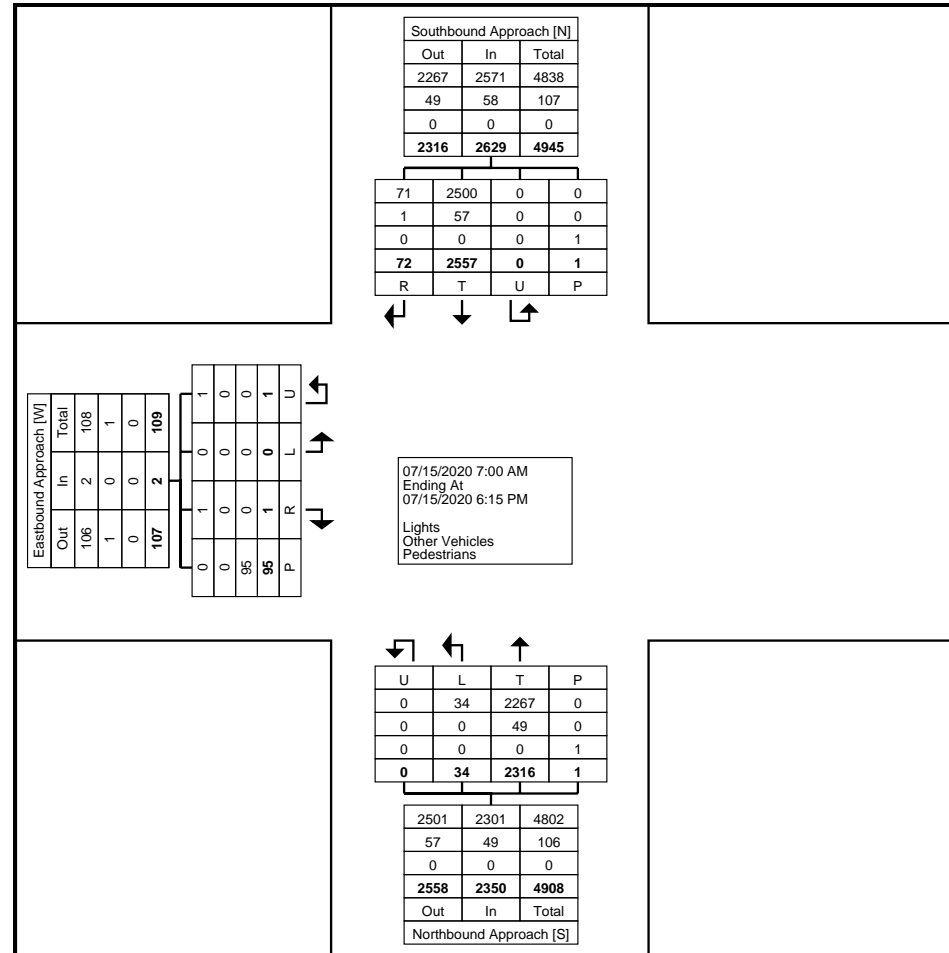
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	72	2557	0	1	2629	2316	34	0	1	2350	1	0	1	95	2	4981
Approach %	2.7	97.3	0.0	-	-	98.6	1.4	0.0	-	-	50.0	0.0	50.0	-	-	-
Total %	1.4	51.3	0.0	-	52.8	46.5	0.7	0.0	-	47.2	0.0	0.0	0.0	-	0.0	-
Lights	71	2500	0	-	2571	2267	34	0	-	2301	1	0	1	-	2	4874
% Lights	98.6	97.8	-	-	97.8	97.9	100.0	-	-	97.9	100.0	-	100.0	-	100.0	97.9
Other Vehicles	1	57	0	-	58	49	0	0	-	49	0	0	0	-	0	107
% Other Vehicles	1.4	2.2	-	-	2.2	2.1	0.0	-	-	2.1	0.0	-	0.0	-	0.0	2.1
Pedestrians	-	-	-	1	-	-	-	-	1	-	-	-	-	95	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Connolly Street
Site Code:
Start Date: 07/15/2020
Page No: 3



Turning Movement Data Plot



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue/Connolly Street
Site Code:
Start Date: 07/15/2020
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Southbound Approach					Northbound Approach					Eastbound Approach					Int. Total
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
8:00 AM	2	94	0	0	96	44	2	0	0	46	0	0	0	0	0	142
8:15 AM	2	96	0	0	98	65	3	0	0	68	0	0	0	1	0	166
8:30 AM	2	71	0	1	73	59	2	0	0	61	0	0	0	1	0	134
8:45 AM	2	85	0	0	87	66	1	0	0	67	0	0	0	2	0	154
Total	8	346	0	1	354	234	8	0	0	242	0	0	0	4	0	596
Approach %	2.3	97.7	0.0	-	-	96.7	3.3	0.0	-	-	0.0	0.0	0.0	-	-	-
Total %	1.3	58.1	0.0	-	59.4	39.3	1.3	0.0	-	40.6	0.0	0.0	0.0	-	0.0	-
PHF	1.000	0.901	0.000	-	0.903	0.886	0.667	0.000	-	0.890	0.000	0.000	0.000	-	0.000	0.898
Lights	8	332	0	-	340	225	8	0	-	233	0	0	0	-	0	573
% Lights	100.0	96.0	-	-	96.0	96.2	100.0	-	-	96.3	-	-	-	-	-	96.1
Other Vehicles	0	14	0	-	14	9	0	0	-	9	0	0	0	-	0	23
% Other Vehicles	0.0	4.0	-	-	4.0	3.8	0.0	-	-	3.7	-	-	-	-	-	3.9
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	4	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-



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Count Name: University Avenue/Connolly Street
Site Code:
Start Date: 07/15/2020
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

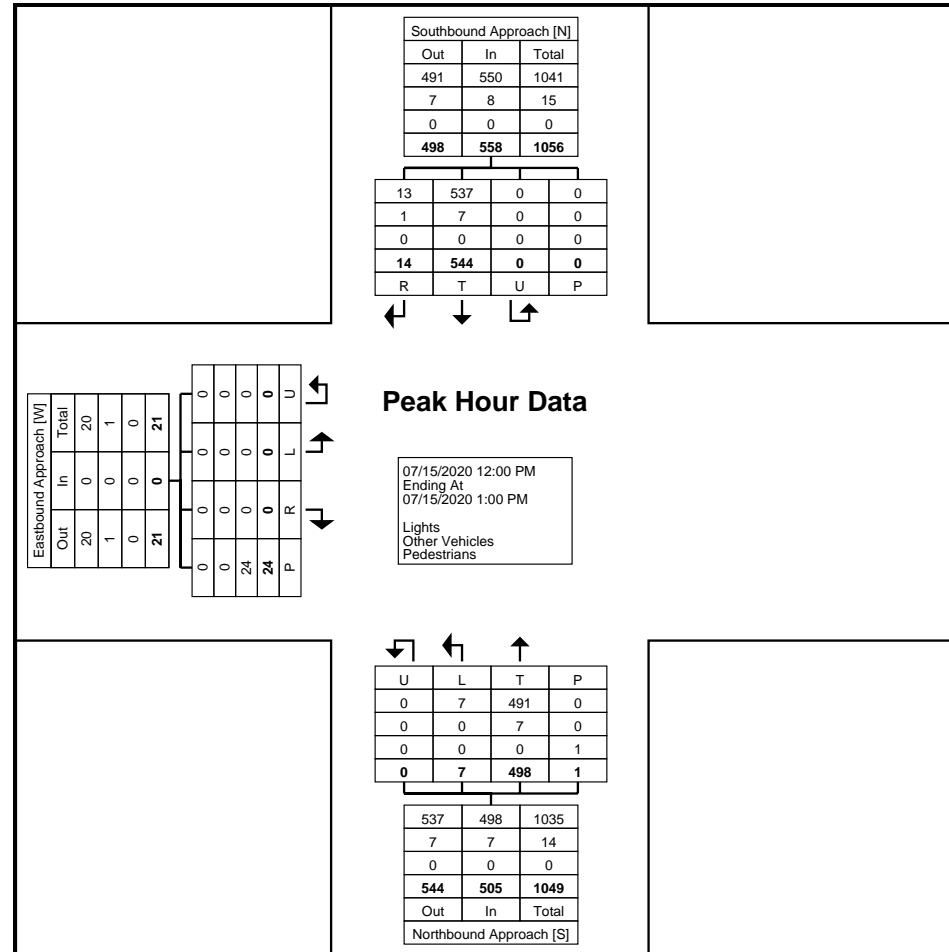
Start Time	Southbound Approach					Northbound Approach					Eastbound Approach					Int. Total
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
12:00 PM	3	158	0	0	161	131	1	0	0	132	0	0	0	4	0	293
12:15 PM	6	122	0	0	128	128	3	0	0	131	0	0	0	8	0	259
12:30 PM	3	132	0	0	135	123	0	0	0	123	0	0	0	5	0	258
12:45 PM	2	132	0	0	134	116	3	0	1	119	0	0	0	7	0	253
Total	14	544	0	0	558	498	7	0	1	505	0	0	0	24	0	1063
Approach %	2.5	97.5	0.0	-	-	98.6	1.4	0.0	-	-	0.0	0.0	0.0	-	-	-
Total %	1.3	51.2	0.0	-	52.5	46.8	0.7	0.0	-	47.5	0.0	0.0	0.0	-	0.0	-
PHF	0.583	0.861	0.000	-	0.866	0.950	0.583	0.000	-	0.956	0.000	0.000	0.000	-	0.000	0.907
Lights	13	537	0	-	550	491	7	0	-	498	0	0	0	-	0	1048
% Lights	92.9	98.7	-	-	98.6	98.6	100.0	-	-	98.6	-	-	-	-	-	98.6
Other Vehicles	1	7	0	-	8	7	0	0	-	7	0	0	0	-	0	15
% Other Vehicles	7.1	1.3	-	-	1.4	1.4	0.0	-	-	1.4	-	-	-	-	-	1.4
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	24	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-



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Count Name: University Avenue/Connolly Street
Site Code:
Start Date: 07/15/2020
Page No: 7



Turning Movement Peak Hour Data Plot (12:00 PM)



EXP Services Inc
602 Rothesay Avenue

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Count Name: University Avenue/Connolly Street
Site Code:
Start Date: 07/15/2020
Page No: 8

Turning Movement Peak Hour Data (4:15 PM)

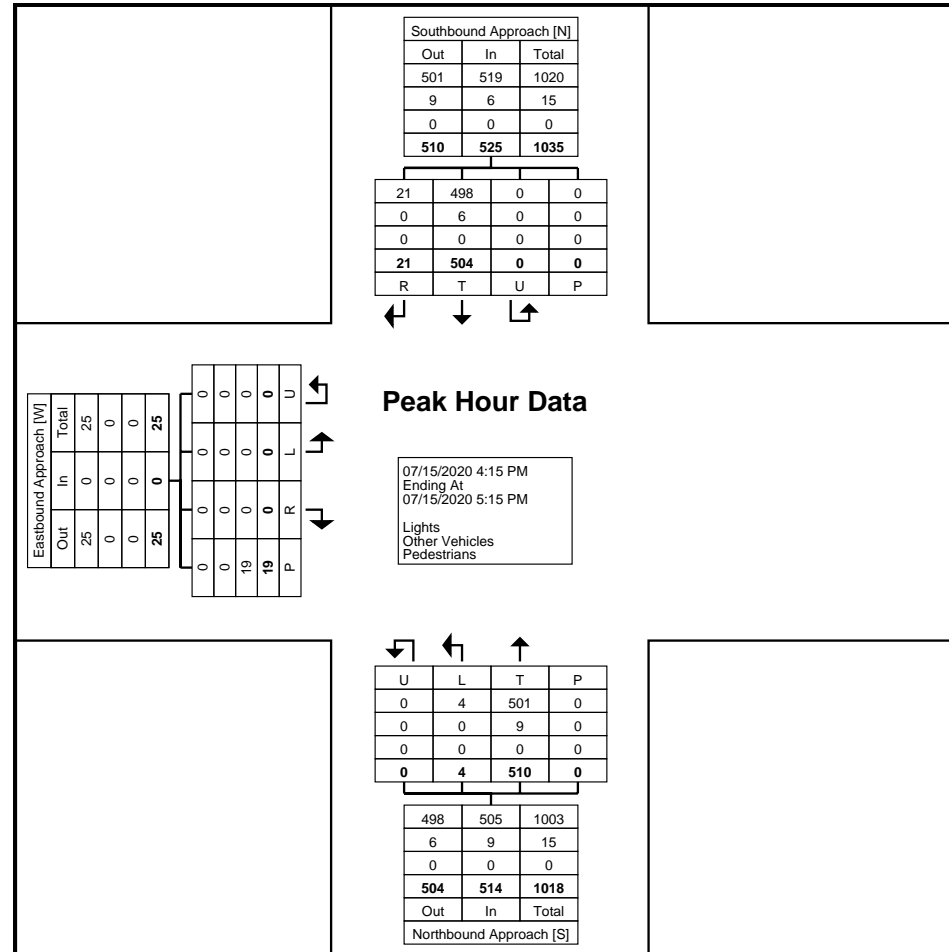
Start Time	Southbound Approach					Northbound Approach					Eastbound Approach					Int. Total
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
4:15 PM	3	132	0	0	135	144	2	0	0	146	0	0	0	5	0	281
4:30 PM	4	130	0	0	134	124	2	0	0	126	0	0	0	6	0	260
4:45 PM	9	105	0	0	114	108	0	0	0	108	0	0	0	6	0	222
5:00 PM	5	137	0	0	142	134	0	0	0	134	0	0	0	2	0	276
Total	21	504	0	0	525	510	4	0	0	514	0	0	0	19	0	1039
Approach %	4.0	96.0	0.0	-	-	99.2	0.8	0.0	-	-	0.0	0.0	0.0	-	-	-
Total %	2.0	48.5	0.0	-	50.5	49.1	0.4	0.0	-	49.5	0.0	0.0	0.0	-	0.0	-
PHF	0.583	0.920	0.000	-	0.924	0.885	0.500	0.000	-	0.880	0.000	0.000	0.000	-	0.000	0.924
Lights	21	498	0	-	519	501	4	0	-	505	0	0	0	-	0	1024
% Lights	100.0	98.8	-	-	98.9	98.2	100.0	-	-	98.2	-	-	-	-	-	98.6
Other Vehicles	0	6	0	-	6	9	0	0	-	9	0	0	0	-	0	15
% Other Vehicles	0.0	1.2	-	-	1.1	1.8	0.0	-	-	1.8	-	-	-	-	-	1.4
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	19	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



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Count Name: University Avenue/Connolly Street
Site Code:
Start Date: 07/15/2020
Page No: 9



Turning Movement Peak Hour Data Plot (4:15 PM)



EXP Services Inc
602 Rothesay Avenue

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Count Name: University Avenue/Connolly Street
Site Code:
Start Date: 07/15/2020
Page No: 10

Grand Total	54	2454	20	0	3	2528	20	0	4	0	42	24	7	2272	19	0	10	2298	44	0	42	0	83	86	4936
Approach %	2.1	97.1	0.8	0.0	-	-	83.3	0.0	16.7	0.0	-	-	0.3	98.9	0.8	0.0	-	-	51.2	0.0	48.8	0.0	-	-	-
Total %	1.1	49.7	0.4	0.0	-	51.2	0.4	0.0	0.1	0.0	-	0.5	0.1	46.0	0.4	0.0	-	46.6	0.9	0.0	0.9	0.0	-	1.7	-
Lights	53	2399	20	0	-	2472	20	0	4	0	-	24	7	2227	18	0	-	2252	41	0	41	0	-	82	4830
% Lights	98.1	97.8	100.0	-	-	97.8	100.0	-	100.0	-	-	100.0	100.0	98.0	94.7	-	-	98.0	93.2	-	97.6	-	-	95.3	97.9
Other Vehicles	1	55	0	0	-	56	0	0	0	0	-	0	0	45	1	0	-	46	3	0	1	0	-	4	106
% Other Vehicles	1.9	2.2	0.0	-	-	2.2	0.0	-	0.0	-	-	0.0	0.0	2.0	5.3	-	-	2.0	6.8	-	2.4	-	-	4.7	2.1
Pedestrians	-	-	-	-	3	-	-	-	-	-	42	-	-	-	-	-	10	-	-	-	-	-	83	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



EXP Services Inc
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Count Name: University Avenue/Reserve Street
Site Code:
Start Date: 07/15/2020
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

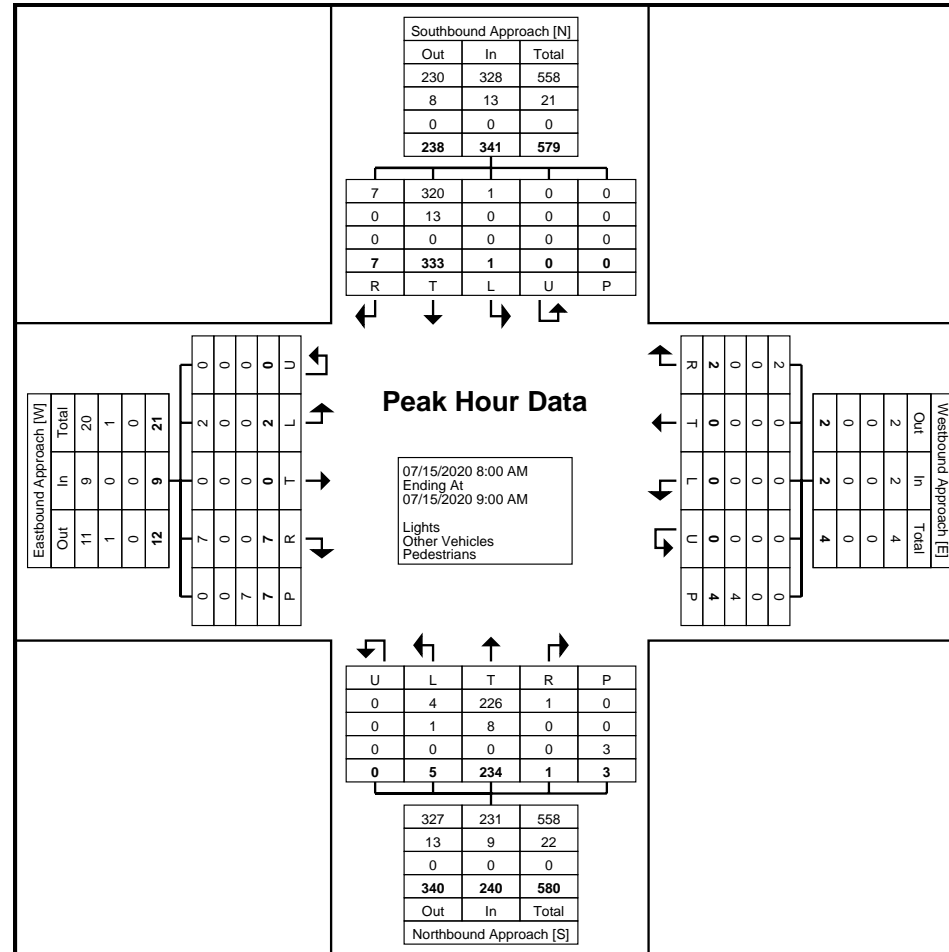
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
8:00 AM	1	95	0	0	0	96	0	0	0	0	0	0	0	41	1	0	0	42	2	0	0	0	0	2	140
8:15 AM	4	88	1	0	0	93	1	0	0	0	2	1	0	64	0	0	1	64	1	0	1	0	3	2	160
8:30 AM	2	62	0	0	0	64	0	0	0	0	1	0	1	63	3	0	1	67	3	0	0	0	1	3	134
8:45 AM	0	88	0	0	0	88	1	0	0	0	1	1	0	66	1	0	1	67	1	0	1	0	3	2	158
Total	7	333	1	0	0	341	2	0	0	0	4	2	1	234	5	0	3	240	7	0	2	0	7	9	592
Approach %	2.1	97.7	0.3	0.0	-	-	100.0	0.0	0.0	0.0	-	-	0.4	97.5	2.1	0.0	-	-	77.8	0.0	22.2	0.0	-	-	-
Total %	1.2	56.3	0.2	0.0	-	57.6	0.3	0.0	0.0	0.0	-	0.3	0.2	39.5	0.8	0.0	-	40.5	1.2	0.0	0.3	0.0	-	1.5	-
PHF	0.438	0.876	0.250	0.000	-	0.888	0.500	0.000	0.000	0.000	-	0.500	0.250	0.886	0.417	0.000	-	0.896	0.583	0.000	0.500	0.000	-	0.750	0.925
Lights	7	320	1	0	-	328	2	0	0	0	-	2	1	226	4	0	-	231	7	0	2	0	-	9	570
% Lights	100.0	96.1	100.0	-	-	96.2	100.0	-	-	-	-	100.0	100.0	96.6	80.0	-	-	96.3	100.0	-	100.0	-	-	100.0	96.3
Other Vehicles	0	13	0	0	-	13	0	0	0	0	-	0	0	8	1	0	-	9	0	0	0	0	-	0	22
% Other Vehicles	0.0	3.9	0.0	-	-	3.8	0.0	-	-	-	-	0.0	0.0	3.4	20.0	-	-	3.8	0.0	-	0.0	-	-	0.0	3.7
Pedestrians	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	3	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



EXP Services Inc
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Count Name: University Avenue/Reserve Street
Site Code:
Start Date: 07/15/2020
Page No: 5



Turning Movement Peak Hour Data Plot (8:00 AM)



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue/Reserve Street
Site Code:
Start Date: 07/15/2020
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

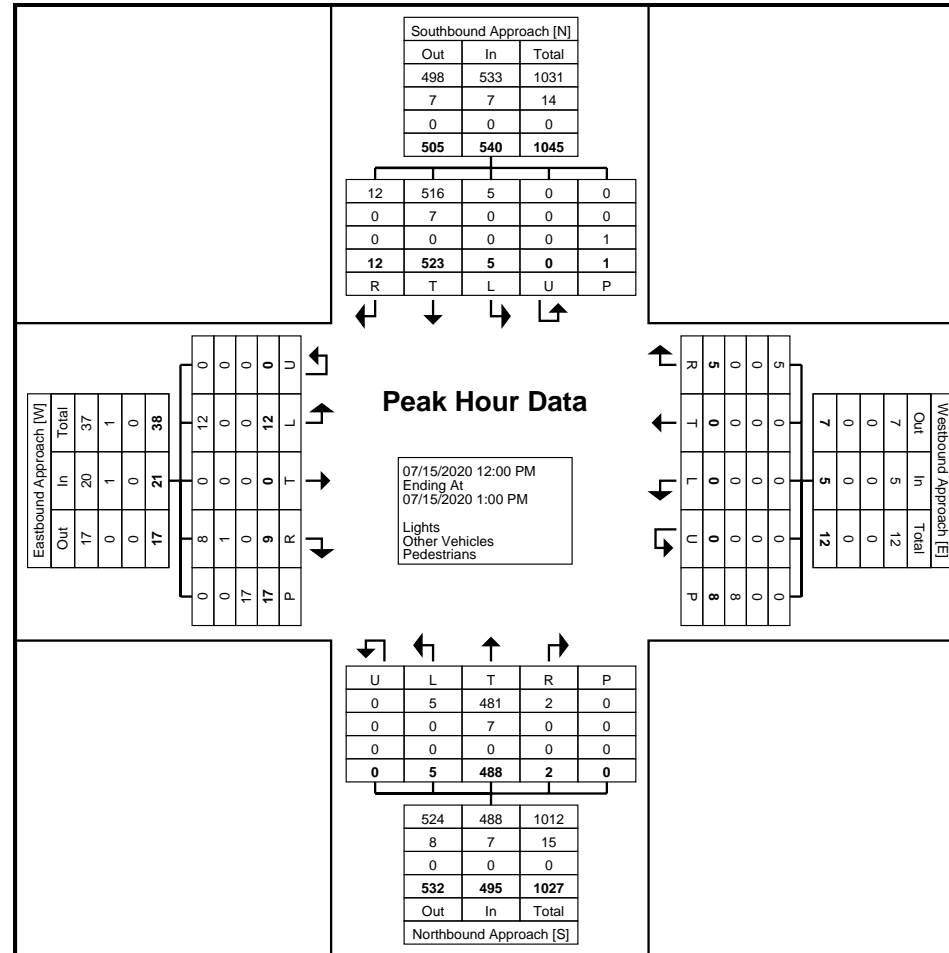
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total	
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total		
12:00 PM	2	149	1	0	0	152	3	0	0	0	4	3	1	126	1	0	0	0	128	0	0	4	0	4	4	287
12:15 PM	4	117	1	0	0	122	1	0	0	0	1	1	1	134	1	0	0	0	136	4	0	3	0	6	7	266
12:30 PM	3	131	2	0	1	136	0	0	0	0	1	0	0	110	2	0	0	0	112	4	0	2	0	2	6	254
12:45 PM	3	126	1	0	0	130	1	0	0	0	2	1	0	118	1	0	0	0	119	1	0	3	0	5	4	254
Total	12	523	5	0	1	540	5	0	0	0	8	5	2	488	5	0	0	0	495	9	0	12	0	17	21	1061
Approach %	2.2	96.9	0.9	0.0	-	-	100.0	0.0	0.0	0.0	-	-	0.4	98.6	1.0	0.0	-	-	42.9	0.0	57.1	0.0	-	-	-	-
Total %	1.1	49.3	0.5	0.0	-	50.9	0.5	0.0	0.0	0.0	-	0.5	0.2	46.0	0.5	0.0	-	46.7	0.8	0.0	1.1	0.0	-	2.0	-	-
PHF	0.750	0.878	0.625	0.000	-	0.888	0.417	0.000	0.000	0.000	-	0.417	0.500	0.910	0.625	0.000	-	0.910	0.563	0.000	0.750	0.000	-	0.750	0.924	
Lights	12	516	5	0	-	533	5	0	0	0	-	5	2	481	5	0	-	488	8	0	12	0	-	20	1046	
% Lights	100.0	98.7	100.0	-	-	98.7	100.0	-	-	-	-	100.0	100.0	98.6	100.0	-	-	98.6	88.9	-	100.0	-	-	95.2	98.6	
Other Vehicles	0	7	0	0	-	7	0	0	0	0	-	0	0	7	0	0	-	7	1	0	0	0	-	1	15	
% Other Vehicles	0.0	1.3	0.0	-	-	1.3	0.0	-	-	-	-	0.0	0.0	1.4	0.0	-	-	1.4	11.1	-	0.0	-	-	4.8	1.4	
Pedestrians	-	-	-	-	1	-	-	-	-	-	8	-	-	-	-	-	0	-	-	-	-	-	17	-	-	
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	



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Count Name: University Avenue/Reserve Street
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Start Date: 07/15/2020
Page No: 7



Turning Movement Peak Hour Data Plot (12:00 PM)



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Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue/Reserve Street
Site Code:
Start Date: 07/15/2020
Page No: 8

Turning Movement Peak Hour Data (4:15 PM)

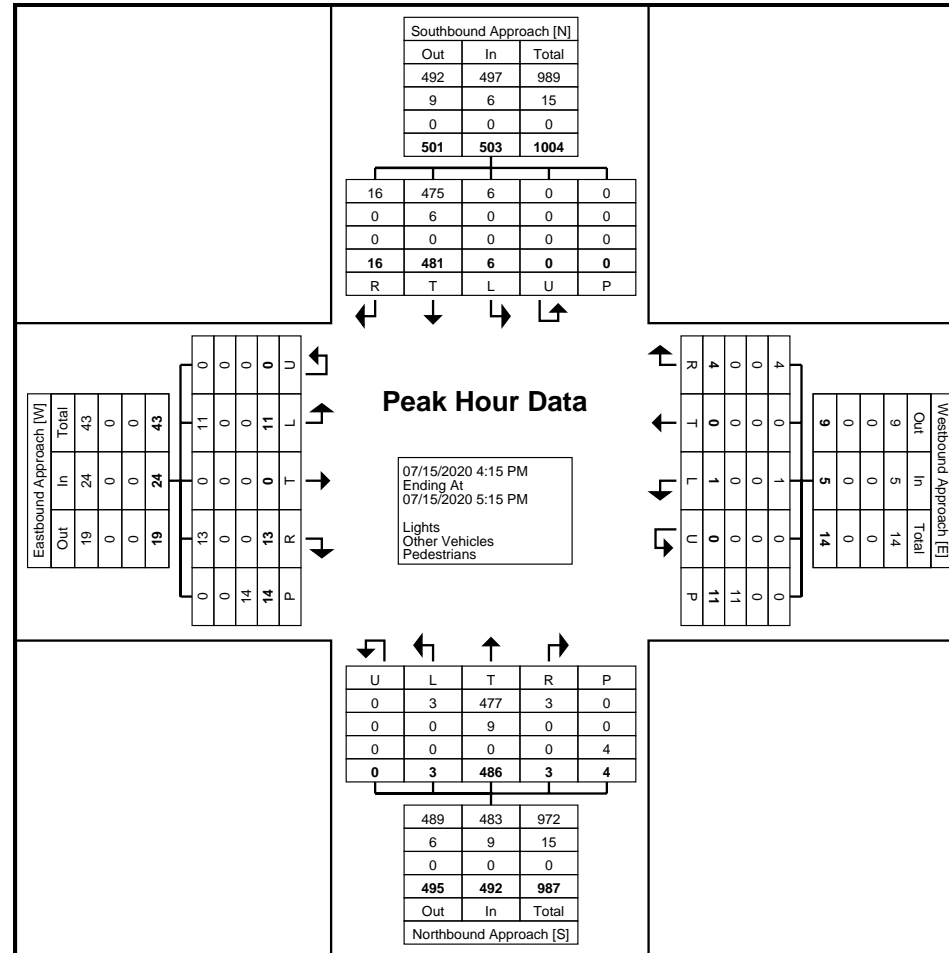
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:15 PM	7	128	1	0	0	136	1	0	0	0	2	1	1	135	1	0	1	137	2	0	4	0	2	6	280
4:30 PM	3	119	2	0	0	124	0	0	1	0	4	1	1	120	1	0	1	122	1	0	3	0	7	4	251
4:45 PM	2	101	0	0	0	103	2	0	0	0	4	2	0	105	1	0	2	106	5	0	2	0	3	7	218
5:00 PM	4	133	3	0	0	140	1	0	0	0	1	1	1	126	0	0	0	127	5	0	2	0	2	7	275
Total	16	481	6	0	0	503	4	0	1	0	11	5	3	486	3	0	4	492	13	0	11	0	14	24	1024
Approach %	3.2	95.6	1.2	0.0	-	-	80.0	0.0	20.0	0.0	-	-	0.6	98.8	0.6	0.0	-	-	54.2	0.0	45.8	0.0	-	-	-
Total %	1.6	47.0	0.6	0.0	-	49.1	0.4	0.0	0.1	0.0	-	0.5	0.3	47.5	0.3	0.0	-	48.0	1.3	0.0	1.1	0.0	-	2.3	-
PHF	0.571	0.904	0.500	0.000	-	0.898	0.500	0.000	0.250	0.000	-	0.625	0.750	0.900	0.750	0.000	-	0.898	0.650	0.000	0.688	0.000	-	0.857	0.914
Lights	16	475	6	0	-	497	4	0	1	0	-	5	3	477	3	0	-	483	13	0	11	0	-	24	1009
% Lights	100.0	98.8	100.0	-	-	98.8	100.0	-	100.0	-	-	100.0	100.0	98.1	100.0	-	-	98.2	100.0	-	100.0	-	-	100.0	98.5
Other Vehicles	0	6	0	0	-	6	0	0	0	0	-	0	0	9	0	0	-	9	0	0	0	0	-	0	15
% Other Vehicles	0.0	1.2	0.0	-	-	1.2	0.0	-	0.0	-	-	0.0	0.0	1.9	0.0	-	-	1.8	0.0	-	0.0	-	-	0.0	1.5
Pedestrians	-	-	-	-	0	-	-	-	-	-	11	-	-	-	-	-	4	-	-	-	-	-	14	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Reserve Street
Site Code:
Start Date: 07/15/2020
Page No: 9



Turning Movement Peak Hour Data Plot (4:15 PM)



EXP Services Inc
602 Rothesay Avenue

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Count Name: University Avenue/Reserve Street
Site Code:
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Page No: 10



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Bayfield
Street/Alley Street
Site Code:
Start Date: 07/15/2020
Page No: 1

Turning Movement Data

Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	0	35	1	0	0	36	0	0	0	0	0	0	0	27	1	0	0	28	0	0	0	0	2	0	64
7:15 AM	2	56	0	0	0	58	0	0	0	0	0	0	3	43	1	0	2	47	0	0	0	0	4	0	105
7:30 AM	2	65	0	0	0	67	1	0	0	0	2	1	1	42	0	0	1	43	0	0	0	0	2	0	111
7:45 AM	3	77	1	0	0	81	1	0	0	0	0	1	1	61	0	0	2	62	0	0	0	0	0	0	144
Hourly Total	7	233	2	0	0	242	2	0	0	0	2	2	5	173	2	0	5	180	0	0	0	0	8	0	424
8:00 AM	2	95	1	0	0	98	1	0	2	0	0	3	0	48	0	0	0	48	0	0	0	0	0	0	149
8:15 AM	2	79	1	0	0	82	3	0	0	0	1	3	1	68	0	0	1	69	0	0	0	0	5	0	154
8:30 AM	3	61	2	0	0	66	2	1	0	0	1	3	0	66	2	0	5	68	0	0	0	0	3	0	137
8:45 AM	0	91	1	0	0	92	5	1	0	0	1	6	0	62	1	0	0	63	0	0	0	0	2	0	161
Hourly Total	7	326	5	0	0	338	11	2	2	0	3	15	1	244	3	0	6	248	0	0	0	0	10	0	601
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	1	101	2	0	0	104	3	0	1	0	3	4	2	108	1	0	0	111	0	0	0	0	5	0	219
11:45 AM	5	107	4	0	0	116	5	0	0	0	2	5	2	112	2	0	0	116	0	0	0	0	4	0	237
Hourly Total	6	208	6	0	0	220	8	0	1	0	5	9	4	220	3	0	0	227	0	0	0	0	9	0	456
12:00 PM	5	128	1	0	0	134	2	1	0	0	0	3	0	124	2	0	1	126	0	0	0	0	4	0	263
12:15 PM	2	122	0	0	0	124	0	1	0	0	2	1	2	144	0	0	0	146	0	0	0	0	7	0	271
12:30 PM	1	123	7	0	0	131	2	0	0	0	1	2	0	103	1	0	3	104	0	0	0	0	2	0	237
12:45 PM	4	126	3	0	0	133	1	2	0	0	3	3	1	125	2	0	1	128	0	0	0	0	4	0	264
Hourly Total	12	499	11	0	0	522	5	4	0	0	6	9	3	496	5	0	5	504	0	0	0	0	17	0	1035
1:00 PM	3	120	2	0	0	125	4	0	0	0	1	4	0	117	0	0	0	117	0	0	0	0	10	0	246
1:15 PM	0	109	3	0	0	112	0	0	0	0	2	0	0	133	3	0	3	136	0	0	0	0	7	0	248
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	3	229	5	0	0	237	4	0	0	0	3	4	0	250	3	0	3	253	0	0	0	0	17	0	494
4:00 PM	2	113	4	0	0	119	2	0	0	0	0	2	1	136	4	0	1	141	0	0	0	1	2	1	263
4:15 PM	5	117	3	0	0	125	3	1	0	0	0	4	0	131	4	0	0	135	0	0	0	0	5	0	264
4:30 PM	0	119	3	0	0	122	2	0	0	0	1	2	1	120	2	0	4	123	0	0	0	0	10	0	247
4:45 PM	0	98	2	0	0	100	2	1	0	0	0	3	0	109	3	0	0	112	0	0	0	0	3	0	215
Hourly Total	7	447	12	0	0	466	9	2	0	0	1	11	2	496	13	0	5	511	0	0	0	1	20	1	989
5:00 PM	7	128	2	0	0	137	1	1	1	0	2	3	2	115	1	0	1	118	0	0	0	0	1	0	258
5:15 PM	4	128	0	0	0	132	5	0	0	0	4	5	1	99	1	0	2	101	0	0	0	0	9	0	238
5:30 PM	5	113	0	0	0	118	1	0	0	0	6	1	0	96	3	0	1	99	0	0	0	0	5	0	218
5:45 PM	6	77	1	0	0	84	1	0	1	0	0	2	2	76	0	0	3	78	0	0	0	0	9	0	164

Hourly Total	22	446	3	0	0	471	8	1	2	0	12	11	5	386	5	0	7	396	0	0	0	0	24	0	878
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	2
Grand Total	64	2388	44	0	0	2496	47	9	5	0	32	61	20	2267	34	0	31	2321	0	0	0	1	105	1	4879
Approach %	2.6	95.7	1.8	0.0	-	-	77.0	14.8	8.2	0.0	-	-	0.9	97.7	1.5	0.0	-	-	0.0	0.0	0.0	100.0	-	-	-
Total %	1.3	48.9	0.9	0.0	-	51.2	1.0	0.2	0.1	0.0	-	1.3	0.4	46.5	0.7	0.0	-	47.6	0.0	0.0	0.0	0.0	-	0.0	-
Lights	63	2333	43	0	-	2439	46	9	5	0	-	60	19	2218	34	0	-	2271	0	0	0	1	-	1	4771
% Lights	98.4	97.7	97.7	-	-	97.7	97.9	100.0	100.0	-	-	98.4	95.0	97.8	100.0	-	-	97.8	-	-	-	100.0	-	100.0	97.8
Other Vehicles	1	55	1	0	-	57	1	0	0	0	-	1	1	49	0	0	-	50	0	0	0	0	-	0	108
% Other Vehicles	1.6	2.3	2.3	-	-	2.3	2.1	0.0	0.0	-	-	1.6	5.0	2.2	0.0	-	-	2.2	-	-	-	0.0	-	0.0	2.2
Pedestrians	-	-	-	-	0	-	-	-	-	-	32	-	-	-	-	-	-	31	-	-	-	-	105	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Bayfield
Street/Alley Street
Site Code:
Start Date: 07/15/2020
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

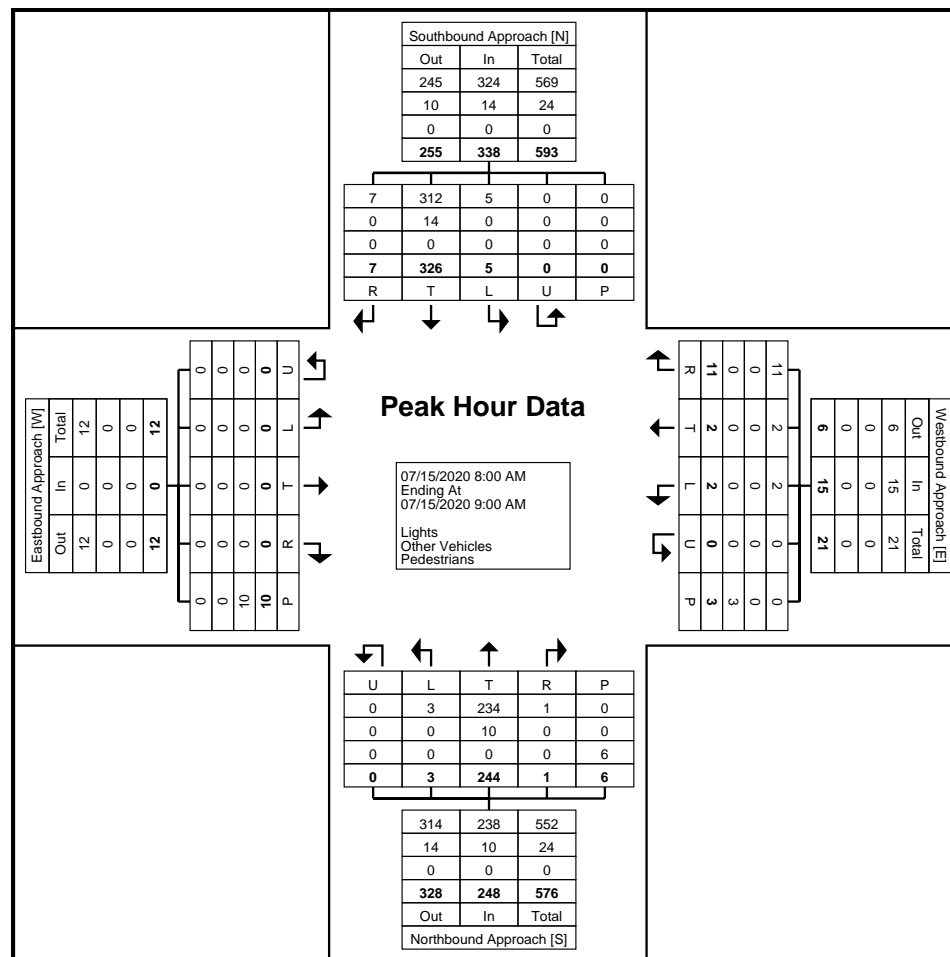
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
8:00 AM	2	95	1	0	0	98	1	0	2	0	0	3	0	48	0	0	0	48	0	0	0	0	0	0	149
8:15 AM	2	79	1	0	0	82	3	0	0	0	1	3	1	68	0	0	1	69	0	0	0	0	5	0	154
8:30 AM	3	61	2	0	0	66	2	1	0	0	1	3	0	66	2	0	5	68	0	0	0	0	3	0	137
8:45 AM	0	91	1	0	0	92	5	1	0	0	1	6	0	62	1	0	0	63	0	0	0	0	2	0	161
Total	7	326	5	0	0	338	11	2	2	0	3	15	1	244	3	0	6	248	0	0	0	0	10	0	601
Approach %	2.1	96.4	1.5	0.0	-	-	73.3	13.3	13.3	0.0	-	-	0.4	98.4	1.2	0.0	-	-	0.0	0.0	0.0	0.0	-	-	-
Total %	1.2	54.2	0.8	0.0	-	56.2	1.8	0.3	0.3	0.0	-	2.5	0.2	40.6	0.5	0.0	-	41.3	0.0	0.0	0.0	0.0	-	0.0	-
PHF	0.583	0.858	0.625	0.000	-	0.862	0.550	0.500	0.250	0.000	-	0.625	0.250	0.897	0.375	0.000	-	0.899	0.000	0.000	0.000	0.000	-	0.000	0.933
Lights	7	312	5	0	-	324	11	2	2	0	-	15	1	234	3	0	-	238	0	0	0	0	-	0	577
% Lights	100.0	95.7	100.0	-	-	95.9	100.0	100.0	100.0	-	-	100.0	100.0	95.9	100.0	-	-	96.0	-	-	-	-	-	-	96.0
Other Vehicles	0	14	0	0	-	14	0	0	0	0	-	0	0	10	0	0	-	10	0	0	0	0	-	0	24
% Other Vehicles	0.0	4.3	0.0	-	-	4.1	0.0	0.0	0.0	-	-	0.0	0.0	4.1	0.0	0.0	-	4.0	-	-	-	-	-	-	4.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	6	-	-	-	-	-	10	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Count Name: University Avenue/Bayfield
Street/Alley Street
Site Code:
Start Date: 07/15/2020
Page No: 5



Turning Movement Peak Hour Data Plot (8:00 AM)



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
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Count Name: University Avenue/Bayfield
Street/Alley Street
Site Code:
Start Date: 07/15/2020
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

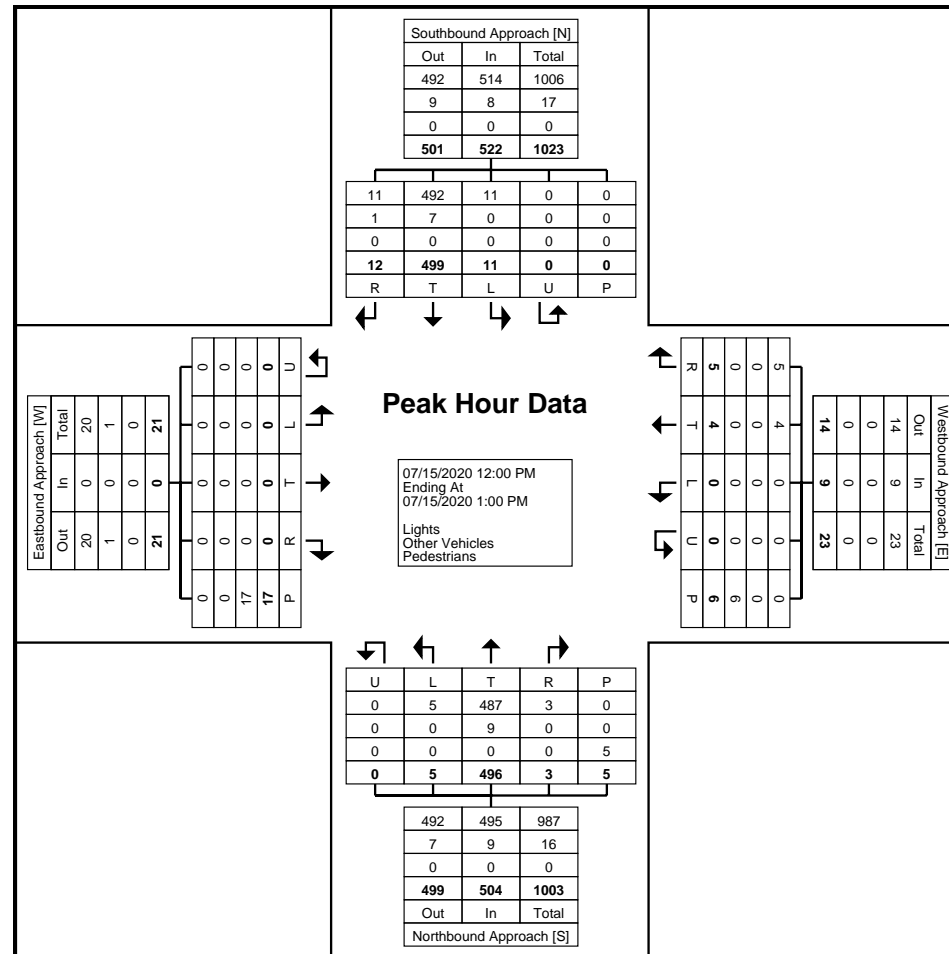
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
12:00 PM	5	128	1	0	0	134	2	1	0	0	0	3	0	124	2	0	1	126	0	0	0	0	4	0	263
12:15 PM	2	122	0	0	0	124	0	1	0	0	2	1	2	144	0	0	0	146	0	0	0	0	7	0	271
12:30 PM	1	123	7	0	0	131	2	0	0	0	1	2	0	103	1	0	3	104	0	0	0	0	2	0	237
12:45 PM	4	126	3	0	0	133	1	2	0	0	3	3	1	125	2	0	1	128	0	0	0	0	4	0	264
Total	12	499	11	0	0	522	5	4	0	0	6	9	3	496	5	0	5	504	0	0	0	0	17	0	1035
Approach %	2.3	95.6	2.1	0.0	-	-	55.6	44.4	0.0	0.0	-	-	0.6	98.4	1.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	-
Total %	1.2	48.2	1.1	0.0	-	50.4	0.5	0.4	0.0	0.0	-	0.9	0.3	47.9	0.5	0.0	-	48.7	0.0	0.0	0.0	0.0	-	0.0	-
PHF	0.600	0.975	0.393	0.000	-	0.974	0.625	0.500	0.000	0.000	-	0.750	0.375	0.861	0.625	0.000	-	0.863	0.000	0.000	0.000	0.000	-	0.000	0.955
Lights	11	492	11	0	-	514	5	4	0	0	-	9	3	487	5	0	-	495	0	0	0	0	-	0	1018
% Lights	91.7	98.6	100.0	-	-	98.5	100.0	100.0	-	-	-	100.0	100.0	98.2	100.0	-	-	98.2	-	-	-	-	-	-	98.4
Other Vehicles	1	7	0	0	-	8	0	0	0	0	-	0	0	9	0	0	-	9	0	0	0	0	-	0	17
% Other Vehicles	8.3	1.4	0.0	-	-	1.5	0.0	0.0	-	-	-	0.0	0.0	1.8	0.0	-	-	1.8	-	-	-	-	-	-	1.6
Pedestrians	-	-	-	-	0	-	-	-	-	-	6	-	-	-	-	-	5	-	-	-	-	-	17	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-



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Page No: 7



Turning Movement Peak Hour Data Plot (12:00 PM)



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Count Name: University Avenue/Bayfield
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Turning Movement Peak Hour Data (4:00 PM)

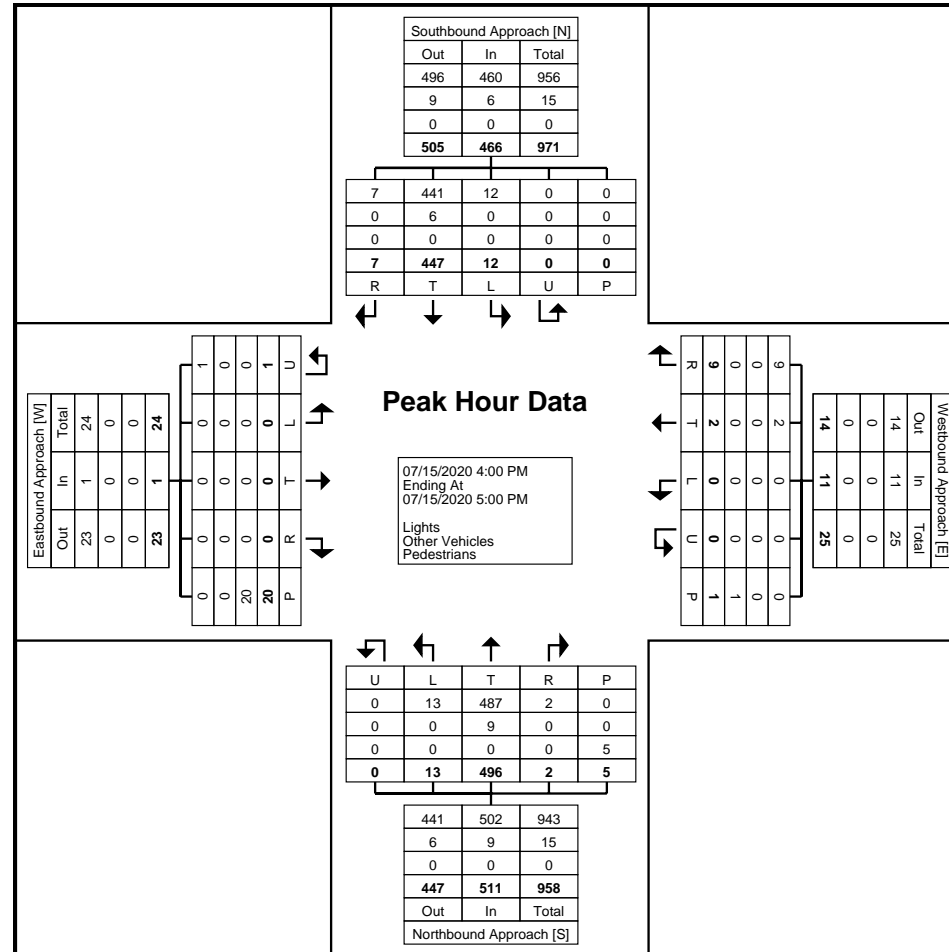
Start Time	Southbound Approach Southbound						Westbound Approach Westbound						Northbound Approach Northbound						Eastbound Approach Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:00 PM	2	113	4	0	0	119	2	0	0	0	0	2	1	136	4	0	1	141	0	0	0	1	2	1	263
4:15 PM	5	117	3	0	0	125	3	1	0	0	0	4	0	131	4	0	0	135	0	0	0	0	5	0	264
4:30 PM	0	119	3	0	0	122	2	0	0	0	1	2	1	120	2	0	4	123	0	0	0	0	10	0	247
4:45 PM	0	98	2	0	0	100	2	1	0	0	0	3	0	109	3	0	0	112	0	0	0	0	3	0	215
Total	7	447	12	0	0	466	9	2	0	0	1	11	2	496	13	0	5	511	0	0	0	1	20	1	989
Approach %	1.5	95.9	2.6	0.0	-	-	81.8	18.2	0.0	0.0	-	-	0.4	97.1	2.5	0.0	-	-	0.0	0.0	0.0	100.0	-	-	-
Total %	0.7	45.2	1.2	0.0	-	47.1	0.9	0.2	0.0	0.0	-	1.1	0.2	50.2	1.3	0.0	-	51.7	0.0	0.0	0.0	0.1	-	0.1	-
PHF	0.350	0.939	0.750	0.000	-	0.932	0.750	0.500	0.000	0.000	-	0.688	0.500	0.912	0.813	0.000	-	0.906	0.000	0.000	0.000	0.250	-	0.250	0.937
Lights	7	441	12	0	-	460	9	2	0	0	-	11	2	487	13	0	-	502	0	0	0	1	-	1	974
% Lights	100.0	98.7	100.0	-	-	98.7	100.0	100.0	-	-	-	100.0	100.0	98.2	100.0	-	-	98.2	-	-	-	100.0	-	100.0	98.5
Other Vehicles	0	6	0	0	-	6	0	0	0	0	-	0	0	9	0	0	-	9	0	0	0	0	-	0	15
% Other Vehicles	0.0	1.3	0.0	-	-	1.3	0.0	0.0	-	-	-	0.0	0.0	1.8	0.0	-	-	1.8	-	-	-	0.0	-	0.0	1.5
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	5	-	-	-	-	-	20	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



EXP Services Inc
602 Rothesay Avenue

Saint John, New Brunswick, Canada E2H 2H1
506 636 1109 michel.barthelotte@exp.com

Count Name: University Avenue/Bayfield
Street/Alley Street
Site Code:
Start Date: 07/15/2020
Page No: 9



Turning Movement Peak Hour Data Plot (4:00 PM)



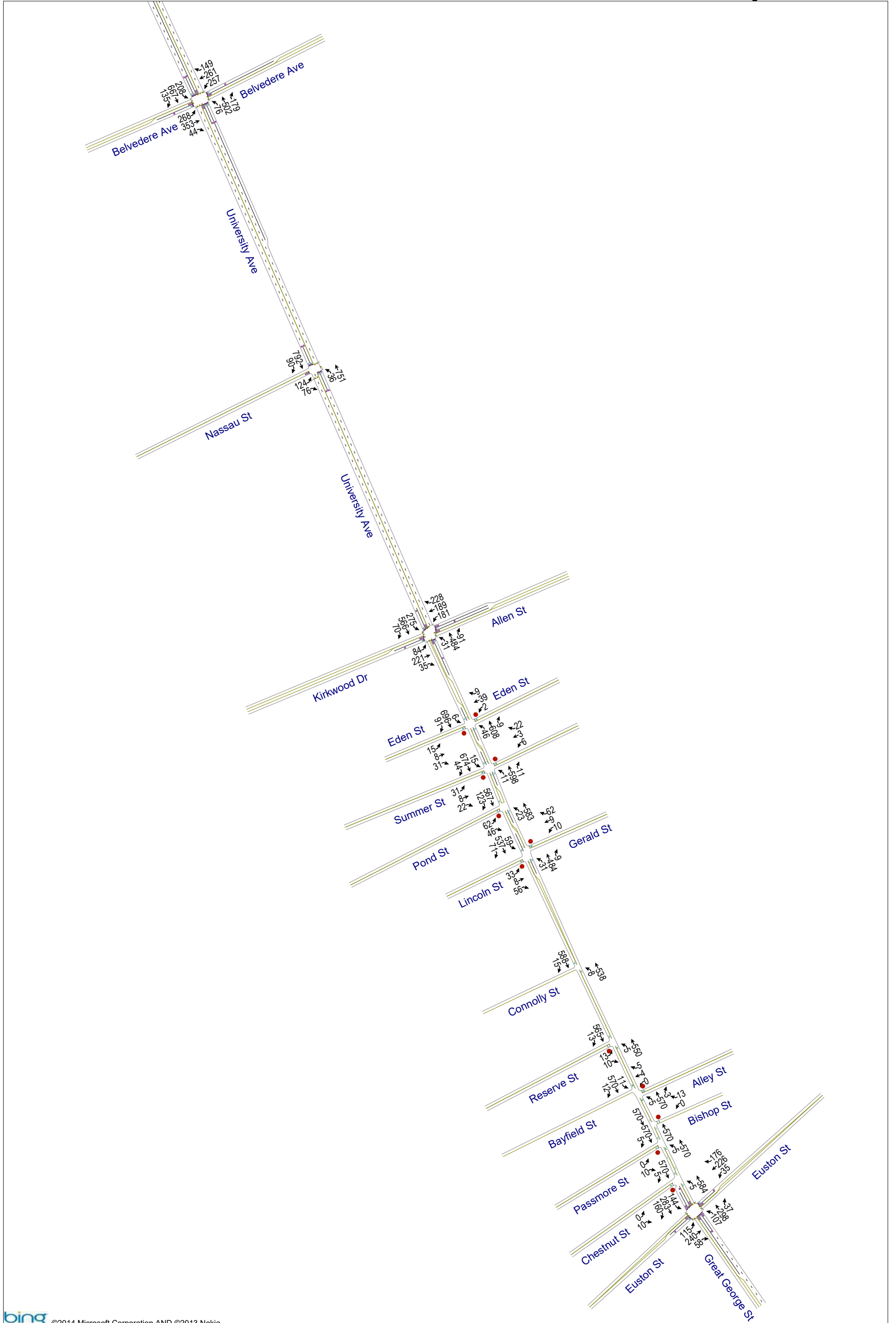
EXP Services Inc
602 Rothesay Avenue

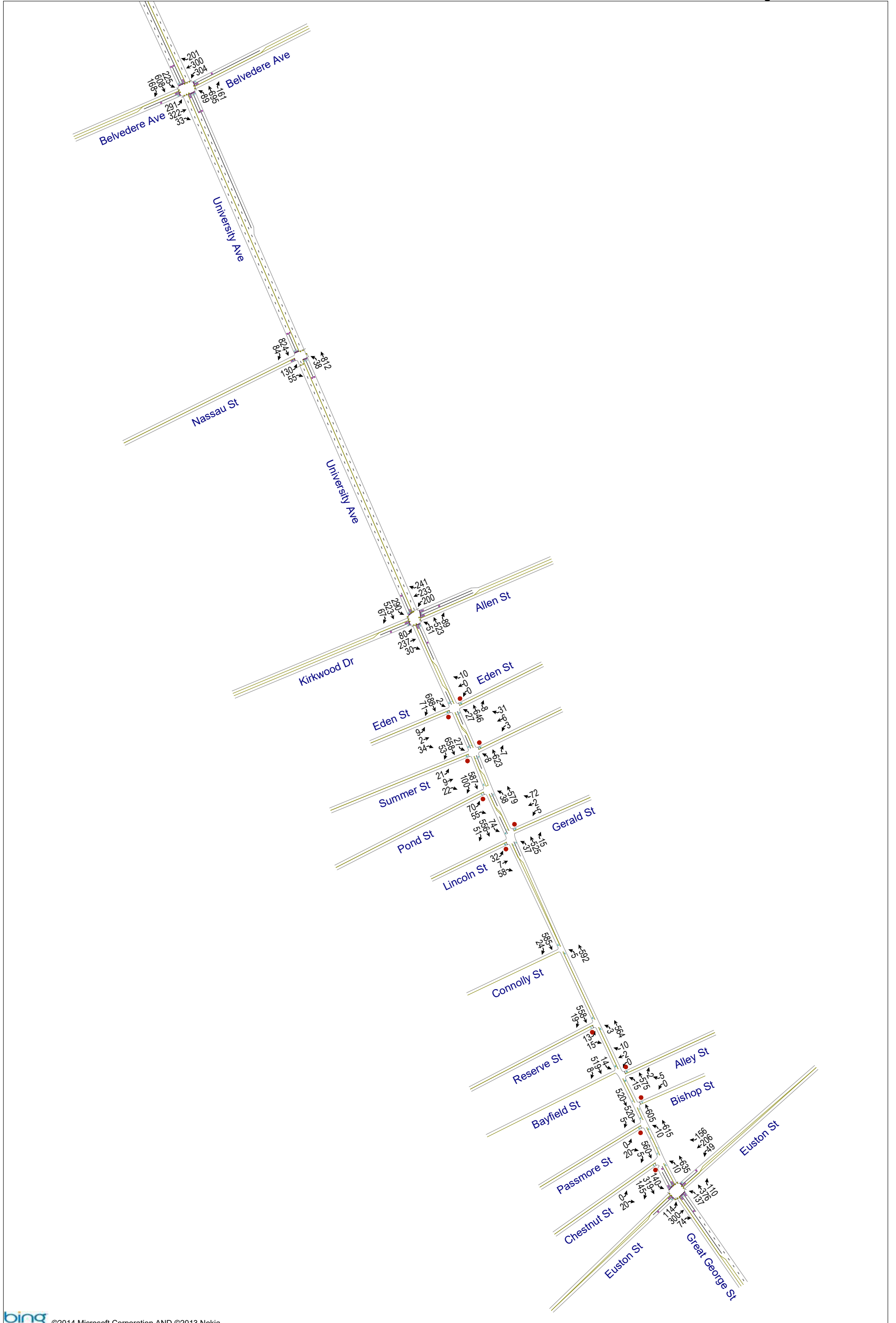
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Count Name: University Avenue/Bayfield
Street/Alley Street
Site Code:
Start Date: 07/15/2020
Page No: 10

Appendix 2 – Traffic Volumes Maps (Existing Conditions)

- Noon Peak Hour
- PM Peak Hour





Appendix 3 – Synchro Reports – Existing Conditions

- Noon Peak
- PM Peak

Lanes, Volumes, Timings
1: University Ave & Belvedere Ave

University Avenue Master Plan
Existing Conditions Noon Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	268	353	44	257	261	149	76	502	179	208	667	135
Future Volume (vph)	268	353	44	257	261	149	76	502	179	208	667	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	105.0		0.0	0.0		210.0	300.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Satd. Flow (prot)	1789	1836	0	1789	1791	0	1789	3425	0	1789	3471	0
Flt Permitted	0.152			0.140			0.158			0.131		
Satd. Flow (perm)	286	1836	0	264	1791	0	298	3425	0	247	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			15			48				25
Link Speed (k/h)		48			48			48				48
Link Distance (m)		174.4			194.3			413.7				604.0
Travel Time (s)		13.1			14.6			31.0				45.3
Peak Hour Factor	0.91	0.92	0.59	0.79	0.80	0.93	0.77	0.87	0.78	0.97	0.93	0.76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	295	459	0	325	486	0	99	806	0	214	895	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	3	8		7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	12.0		6.0	12.0		6.0	20.0		6.0	20.0	
Minimum Split (s)	10.0	32.0		10.0	32.0		10.0	29.0		10.0	29.0	
Total Split (s)	30.0	32.0		30.0	32.0		20.0	60.0		20.0	60.0	
Total Split (%)	21.1%	22.5%		21.1%	22.5%		14.1%	42.3%		14.1%	42.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	47.7	26.5		52.0	28.6		44.5	33.2		52.9	37.8	
Actuated g/C Ratio	0.41	0.23		0.45	0.25		0.39	0.29		0.46	0.33	
v/c Ratio	0.80	1.08		0.81	1.07		0.42	0.79		0.72	0.77	
Control Delay	44.9	108.9		45.2	103.1		24.0	41.8		35.9	39.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	44.9	108.9		45.2	103.1		24.0	41.8		35.9	39.1	
LOS	D	F		D	F		C	D		D	D	
Approach Delay		83.9			79.9			39.9			38.5	
Approach LOS		F			E			D			D	
Queue Length 50th (m)	48.2	~121.8		53.6	~123.6		12.6	85.3		29.3	94.0	
Queue Length 95th (m)	87.7	#216.8		82.6	#194.1		19.5	107.0		54.2	124.9	
Internal Link Dist (m)		150.4			170.3			389.7			580.0	
Turn Bay Length (m)	55.0			105.0						300.0		
Base Capacity (vph)	475	426		471	455		342	1658		331	1668	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	

Lanes, Volumes, Timings
1: University Ave & Belvedere Ave

University Avenue Master Plan
Existing Conditions Noon Peak

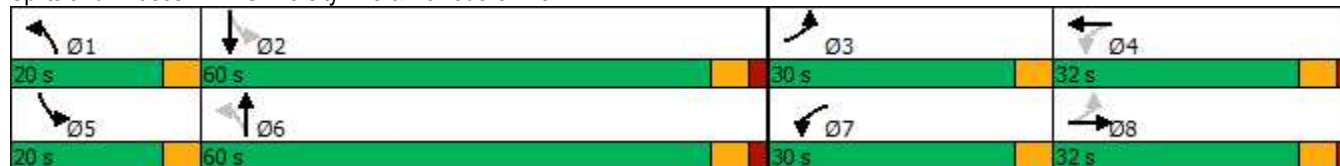


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.62	1.08		0.69	1.07		0.29	0.49		0.65	0.54	

Intersection Summary

Area Type:	Other
Cycle Length:	142
Actuated Cycle Length:	115.2
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.08
Intersection Signal Delay:	57.8
Intersection LOS:	E
Intersection Capacity Utilization	85.5%
ICU Level of Service	E
Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 1: University Ave & Belvedere Ave



Lanes, Volumes, Timings
2: University Ave & Nassau St

University Avenue Master Plan
Existing Conditions Noon Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	124	76	36	751	792	90
Future Volume (vph)	124	76	36	751	792	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	300.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	10.0		10.0			
Satd. Flow (prot)	1730	0	0	3568	2851	0
Flt Permitted	0.971			0.775		
Satd. Flow (perm)	1730	0	0	2773	2851	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	36				21	
Link Speed (k/h)	48			48	48	
Link Distance (m)	280.8			407.5	413.7	
Travel Time (s)	21.1			30.6	31.0	
Peak Hour Factor	0.82	0.76	0.59	0.91	0.91	0.80
Shared Lane Traffic (%)						
Lane Group Flow (vph)	251	0	0	886	983	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	2	
Permitted Phases			2			
Detector Phase	4		2	2	2	
Switch Phase						
Minimum Initial (s)	8.0		16.0	16.0	16.0	
Minimum Split (s)	24.0		34.0	34.0	34.0	
Total Split (s)	30.0		60.0	60.0	60.0	
Total Split (%)	33.3%		66.7%	66.7%	66.7%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	6.0			7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		Min	Min	Min	
Act Effect Green (s)	14.6			40.9	40.9	
Actuated g/C Ratio	0.21			0.59	0.59	
v/c Ratio	0.64			0.54	0.58	
Control Delay	31.2			10.2	10.4	
Queue Delay	0.0			0.0	0.0	
Total Delay	31.2			10.2	10.4	
LOS	C			B	B	
Approach Delay	31.3			10.2	10.4	
Approach LOS	C			B	B	
Queue Length 50th (m)	26.2			31.4	43.5	
Queue Length 95th (m)	47.7			58.3	80.5	
Internal Link Dist (m)	256.8			383.5	389.7	
Turn Bay Length (m)						
Base Capacity (vph)	660			2155	2220	
Starvation Cap Reductn	0			0	0	

Lanes, Volumes, Timings
 2: University Ave & Nassau St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.38			0.41	0.44	

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	69.4
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	12.8
Intersection LOS:	B
Intersection Capacity Utilization	69.7%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 2: University Ave & Nassau St



Lanes, Volumes, Timings
3: University Ave & Kirkwood Dr/Allen St

University Avenue Master Plan
Existing Conditions Noon Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	221	35	181	189	228	31	484	91	275	566	70
Future Volume (vph)	84	221	35	181	189	228	31	484	91	275	566	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	80.0		80.0	55.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Satd. Flow (prot)	1789	1834	0	1789	1883	1601	1789	1836	0	1789	1846	0
Flt Permitted	0.633			0.171			0.216			0.101		
Satd. Flow (perm)	1192	1834	0	322	1883	1601	407	1836	0	190	1846	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				245		10				8
Link Speed (k/h)		48			48			48				48
Link Distance (m)		278.5			213.1			138.3				407.5
Travel Time (s)		20.9			16.0			10.4				30.6
Peak Hour Factor	0.75	0.88	0.67	0.75	0.95	0.93	0.81	0.88	0.81	0.94	0.92	0.74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	303	0	241	199	245	38	662	0	293	710	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8		8	6			2		
Detector Phase	7	4		3	8	8	1	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	7.0	20.0		7.0	20.0	
Minimum Split (s)	10.0	26.0		10.0	26.0	26.0	10.0	32.0		10.0	32.0	
Total Split (s)	20.0	26.0		24.0	30.0	30.0	18.0	60.0		18.0	60.0	
Total Split (%)	15.6%	20.3%		18.8%	23.4%	23.4%	14.1%	46.9%		14.1%	46.9%	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effct Green (s)	33.9	20.3		42.7	26.1	26.1	55.7	45.4		66.7	57.9	
Actuated g/C Ratio	0.29	0.18		0.37	0.23	0.23	0.48	0.39		0.58	0.50	
v/c Ratio	0.28	0.93		0.74	0.47	0.44	0.13	0.91		0.92	0.76	
Control Delay	28.5	82.1		42.6	45.3	7.9	12.5	50.6		61.0	31.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	28.5	82.1		42.6	45.3	7.9	12.5	50.6		61.0	31.1	
LOS	C	F		D	D	A	B	D		E	C	
Approach Delay		67.6			31.0			48.5			39.9	
Approach LOS		E			C			D			D	
Queue Length 50th (m)	17.8	70.3		41.6	41.1	0.0	3.6	138.5		46.6	135.7	
Queue Length 95th (m)	26.5	#132.2		53.0	69.3	21.6	7.8	192.0		#107.0	199.8	
Internal Link Dist (m)		254.5			189.1			114.3			383.5	
Turn Bay Length (m)	45.0			80.0		80.0	55.0					
Base Capacity (vph)	497	327		389	427	553	406	875		320	949	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	

Lanes, Volumes, Timings
 3: University Ave & Kirkwood Dr/Allen St

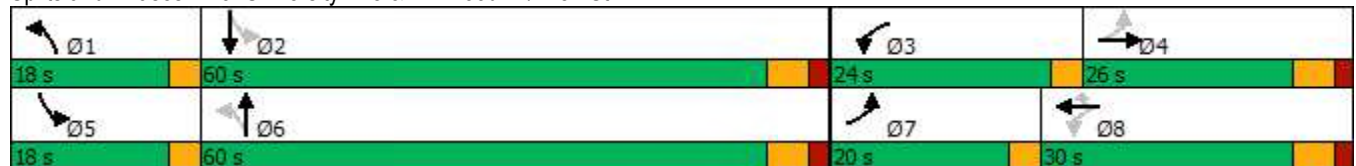


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.23	0.93		0.62	0.47	0.44	0.09	0.76		0.92	0.75	

Intersection Summary

Area Type:	Other
Cycle Length:	128
Actuated Cycle Length:	115.5
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	44.0
Intersection LOS:	D
Intersection Capacity Utilization	86.7%
ICU Level of Service	E
Analysis Period (min)	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: University Ave & Kirkwood Dr/Allen St



Intersection												
Int Delay, s/veh	19.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	15	8	31	2	39	9	46	608	9	6	696	91
Future Vol, veh/h	15	8	31	2	39	9	46	608	9	6	696	91
Conflicting Peds, #/hr	0	0	0	0	0	0	26	0	0	0	0	26
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	56	50	38	50	83	94	50	50	92	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	14	55	4	103	18	55	647	18	12	757	100

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1684	1632	833	1632	1673	656	883	0	0	665	0	0
Stage 1	857	857	-	766	766	-	-	-	-	-	-	-
Stage 2	827	775	-	866	907	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	75	101	369	81	~96	465	766	-	-	924	-	-
Stage 1	352	374	-	395	412	-	-	-	-	-	-	-
Stage 2	366	408	-	348	355	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	90	360	57	~86	465	748	-	-	924	-	-
Mov Cap-2 Maneuver	-	90	-	57	~86	-	-	-	-	-	-	-
Stage 1	318	360	-	366	382	-	-	-	-	-	-	-
Stage 2	238	378	-	280	342	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		272.1	0.8	0.1
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	748	-	-	-	96	924	-
HCM Lane V/C Ratio	0.074	-	-	-	1.298	0.013	-
HCM Control Delay (s)	10.2	-	-	-	272.1	8.9	-
HCM Lane LOS	B	-	-	-	F	A	-
HCM 95th %tile Q(veh)	0.2	-	-	-	8.9	0	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	31	8	22	6	3	22	11	598	11	15	674	44
Future Vol, veh/h	31	8	22	6	3	22	11	598	11	15	674	44
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	58	71	50	38	71	50	94	50	70	95	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	34	14	31	12	8	31	22	636	22	21	709	52

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1488	1479	735	1491	1494	647	761	0	0	658	0	0
Stage 1	777	777	-	691	691	-	-	-	-	-	-	-
Stage 2	711	702	-	800	803	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	102	126	420	102	123	471	851	-	-	930	-	-
Stage 1	390	407	-	435	446	-	-	-	-	-	-	-
Stage 2	424	440	-	379	396	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	87	120	420	83	117	471	851	-	-	930	-	-
Mov Cap-2 Maneuver	87	120	-	83	117	-	-	-	-	-	-	-
Stage 1	380	398	-	424	434	-	-	-	-	-	-	-
Stage 2	379	429	-	331	387	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	62.8		32.1		0.3		0.2	
HCM LOS	F		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	851	-	-	136	183	930	-
HCM Lane V/C Ratio	0.026	-	-	0.58	0.278	0.023	-
HCM Control Delay (s)	9.3	-	-	62.8	32.1	9	-
HCM Lane LOS	A	-	-	F	D	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.9	1.1	0.1	-

Intersection						
Int Delay, s/veh	4.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	62	46	23	583	567	123
Future Vol, veh/h	62	46	23	583	567	123
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	83	58	93	94	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	83	55	40	627	603	152

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1386	679	755	0	-	0
Stage 1	679	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	158	452	855	-	-	-
Stage 1	504	-	-	-	-	-
Stage 2	489	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	151	452	855	-	-	-
Mov Cap-2 Maneuver	151	-	-	-	-	-
Stage 1	480	-	-	-	-	-
Stage 2	489	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	52.1	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	855	-	206	-	-
HCM Lane V/C Ratio	0.046	-	0.67	-	-
HCM Control Delay (s)	9.4	-	52.1	-	-
HCM Lane LOS	A	-	F	-	-
HCM 95th %tile Q(veh)	0.1	-	4.1	-	-

Intersection												
Int Delay, s/veh	10.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	33	8	56	10	9	62	31	484	9	59	537	71
Future Vol, veh/h	33	8	56	10	9	62	31	484	9	59	537	71
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	58	81	45	67	84	91	95	50	69	88	79
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	42	14	69	22	13	74	34	509	18	86	610	90

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1457	1422	655	1455	1458	518	700	0	0	527	0	0
Stage 1	827	827	-	586	586	-	-	-	-	-	-	-
Stage 2	630	595	-	869	872	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	108	136	466	108	129	558	897	-	-	1040	-	-
Stage 1	366	386	-	496	497	-	-	-	-	-	-	-
Stage 2	470	492	-	347	368	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	78	120	466	76	114	558	897	-	-	1040	-	-
Mov Cap-2 Maneuver	78	120	-	76	114	-	-	-	-	-	-	-
Stage 1	352	354	-	477	478	-	-	-	-	-	-	-
Stage 2	381	473	-	261	337	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	86.6		42.1		0.6		1	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	897	-	-	155	202	1040	-
HCM Lane V/C Ratio	0.038	-	-	0.808	0.542	0.082	-
HCM Control Delay (s)	9.2	-	-	86.6	42.1	8.8	-
HCM Lane LOS	A	-	-	F	E	A	-
HCM 95th %tile Q(veh)	0.1	-	-	5.2	2.8	0.3	-

HCM Unsignalized Intersection Capacity Analysis
 8: University Ave & Connolly St

University Avenue Master Plan
 Existing Conditions Noon Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↕	↕	
Traffic Volume (veh/h)	0	0	8	538	588	15
Future Volume (Veh/h)	0	0	8	538	588	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.58	1.00	0.86	0.58
Hourly flow rate (vph)	0	0	14	538	684	26
Pedestrians	24					
Lane Width (m)	0.0					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	379					
pX, platoon unblocked	0.96					
vC, conflicting volume	1287	721	734			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1277	721	734			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	173	427	871			
Direction, Lane #	NB 1	SB 1				
Volume Total	552	710				
Volume Left	14	0				
Volume Right	0	26				
cSH	871	1700				
Volume to Capacity	0.02	0.42				
Queue Length 95th (m)	0.4	0.0				
Control Delay (s)	0.4	0.0				
Lane LOS	A					
Approach Delay (s)	0.4	0.0				
Approach LOS						
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			38.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	10	5	550	565	13
Future Vol, veh/h	13	10	5	550	565	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	56	63	91	88	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	18	8	604	642	17

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1271	651	659	0	-	0
Stage 1	651	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	185	469	929	-	-	-
Stage 1	519	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	183	469	929	-	-	-
Mov Cap-2 Maneuver	183	-	-	-	-	-
Stage 1	512	-	-	-	-	-
Stage 2	536	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.7	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	929	-	265	-	-
HCM Lane V/C Ratio	0.009	-	0.133	-	-
HCM Control Delay (s)	8.9	0	20.7	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕					↕		
Traffic Vol, veh/h	0	0	0	0	4	5	5	570	3	11	570	12
Future Vol, veh/h	0	0	0	0	4	5	5	570	3	11	570	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	50	63	63	86	38	39	98	60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	8	8	8	663	8	28	582	20

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1331	1341	667	602	0	0
Stage 1	683	683	-	-	-	-
Stage 2	648	658	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	4.12
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	2.218
Pot Cap-1 Maneuver	170	152	459	975	-	919
Stage 1	502	449	-	-	-	-
Stage 2	521	461	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	160	0	459	975	-	919
Mov Cap-2 Maneuver	160	0	-	-	-	-
Stage 1	495	0	-	-	-	-
Stage 2	497	0	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.1	0.1	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBRWBLn1	SBL	SBT	SBR
Capacity (veh/h)	975	-	459	919	-	-
HCM Lane V/C Ratio	0.008	-	0.035	0.031	-	-
HCM Control Delay (s)	8.7	0	13.1	9	0	-
HCM Lane LOS	A	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	0.1	0.1	-	-

Lanes, Volumes, Timings
11: Great George St/University Ave & Euston St

University Avenue Master Plan
Existing Conditions Noon Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	240	58	35	226	176	107	298	37	144	283	160
Future Volume (vph)	115	240	58	35	226	176	107	298	37	144	283	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	37.0		0.0	30.0		0.0	100.0		0.0	0.0		33.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Satd. Flow (prot)	1789	1819	0	1789	1759	0	1789	1883	1601	1789	1883	1601
Flt Permitted	0.156			0.474			0.389			0.312		
Satd. Flow (perm)	294	1819	0	893	1759	0	733	1883	1601	588	1883	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			33				114			147
Link Speed (k/h)		48			48			48				48
Link Distance (m)		200.0			243.8			163.4				49.1
Travel Time (s)		15.0			18.3			12.3				3.7
Peak Hour Factor	0.73	0.91	0.75	0.66	0.89	0.88	0.77	0.90	0.78	0.86	0.92	0.85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	341	0	53	454	0	139	331	47	167	308	188
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	25.0	25.0	7.0	25.0	25.0
Minimum Split (s)	12.0	27.0		12.0	27.0		12.0	30.0	30.0	12.0	30.0	30.0
Total Split (s)	20.0	35.0		20.0	35.0		20.0	40.0	40.0	20.0	40.0	40.0
Total Split (%)	17.4%	30.4%		17.4%	30.4%		17.4%	34.8%	34.8%	17.4%	34.8%	34.8%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	44.4	35.0		35.8	28.1		37.0	26.8	26.8	39.2	27.9	27.9
Actuated g/C Ratio	0.45	0.36		0.36	0.29		0.38	0.27	0.27	0.40	0.28	0.28
v/c Ratio	0.51	0.52		0.13	0.86		0.36	0.64	0.09	0.45	0.58	0.34
Control Delay	22.7	29.4		17.3	49.3		20.4	39.3	0.4	21.8	36.2	10.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	29.4		17.3	49.3		20.4	39.3	0.4	21.8	36.2	10.1
LOS	C	C		B	D		C	D	A	C	D	B
Approach Delay		27.3			45.9			30.7			25.2	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	16.6	48.8		5.2	73.8		16.2	56.9	0.0	19.8	51.3	5.9
Queue Length 95th (m)	27.4	90.7		10.1	#149.4		24.4	92.4	0.0	32.7	84.4	20.2
Internal Link Dist (m)		176.0			219.8			139.4			25.1	
Turn Bay Length (m)	37.0			30.0			100.0					33.0
Base Capacity (vph)	365	656		528	566		472	679	650	437	679	671
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0

Lanes, Volumes, Timings
 11: Great George St/University Ave & Euston St

University Avenue Master Plan
 Existing Conditions Noon Peak

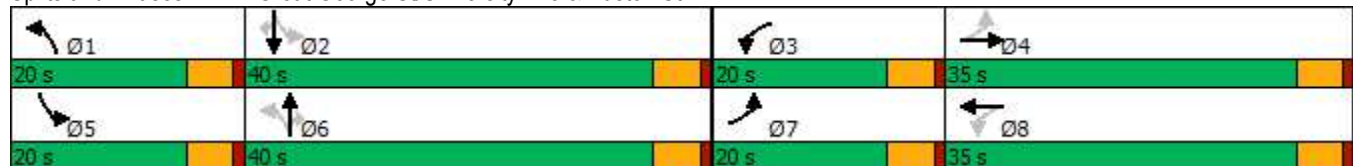


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.52		0.10	0.80		0.29	0.49	0.07	0.38	0.45	0.28

Intersection Summary

Area Type:	Other
Cycle Length:	115
Actuated Cycle Length:	98.1
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	31.8
Intersection LOS:	C
Intersection Capacity Utilization	74.5%
ICU Level of Service	D
Analysis Period (min)	15
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 11: Great George St/University Ave & Euston St



Timings
1: University Ave & Belvedere Ave

University Avenue Master Plan
Existing Conditions PM Peak









Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	291	322	33	304	300	201	89	695	161	225	608	168
Future Volume (vph)	291	322	33	304	300	201	89	695	161	225	608	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	105.0		0.0	0.0		210.0	300.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		48			48			48				48
Link Distance (m)		174.4			194.3			413.7				604.0
Travel Time (s)		13.1			14.6			31.0				45.3
Peak Hour Factor	0.88	0.96	0.70	0.93	0.96	0.86	0.95	0.92	0.84	0.89	0.89	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	331	382	0	327	547	0	94	947	0	253	870	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	3	8		7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	12.0		6.0	12.0		6.0	20.0		6.0	20.0	
Minimum Split (s)	10.0	32.0		10.0	32.0		10.0	29.0		10.0	29.0	
Total Split (s)	30.0	32.0		30.0	32.0		20.0	60.0		20.0	60.0	
Total Split (%)	21.1%	22.5%		21.1%	22.5%		14.1%	42.3%		14.1%	42.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	51.0	26.5		50.9	26.4		52.4	41.4		62.9	47.8	
Actuated g/C Ratio	0.40	0.21		0.40	0.21		0.42	0.33		0.50	0.38	
v/c Ratio	0.86	0.97		0.86	1.41		0.35	0.82		0.87	0.65	
Control Delay	55.6	89.9		54.7	235.9		21.0	44.3		58.9	33.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	55.6	89.9		54.7	235.9		21.0	44.3		58.9	33.9	
LOS	E	F		D	F		C	D		E	C	
Approach Delay		74.0			168.1			42.2				39.6
Approach LOS		E			F			D				D
Queue Length 50th (m)	63.5	~99.6		63.0	~189.9		12.6	115.2		45.1	93.6	
Queue Length 95th (m)	#118.9	#186.2		#121.6	#286.3		21.8	139.5		#94.7	116.3	
Internal Link Dist (m)		150.4			170.3			389.7			580.0	
Turn Bay Length (m)	55.0			105.0						300.0		
Base Capacity (vph)	433	392		433	387		369	1521		299	1540	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.76	0.97		0.76	1.41		0.25	0.62		0.85	0.56	

Timings
 1: University Ave & Belvedere Ave

Intersection Summary

Area Type:	Other		
Cycle Length:	142		
Actuated Cycle Length:	126		
Natural Cycle:	95		
Control Type:	Actuated-Uncoordinated		
Maximum v/c Ratio:	1.41		
Intersection Signal Delay:	76.8	Intersection LOS:	E
Intersection Capacity Utilization:	97.7%	ICU Level of Service:	F
Analysis Period (min)	15		
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.			

Splits and Phases: 1: University Ave & Belvedere Ave

 Ø1	 Ø2	 Ø3	 Ø4
20 s	60 s	30 s	32 s
 Ø5	 Ø6	 Ø7	 Ø8
20 s	60 s	30 s	32 s

Timings
2: University Ave & Nassau St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	130	55	38	812	824	84
Future Volume (vph)	130	55	38	812	824	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	300.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	10.0		10.0			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	48			48	48	
Link Distance (m)	280.8			407.5	413.7	
Travel Time (s)	21.1			30.6	31.0	
Confl. Peds. (#/hr)			25			25
Peak Hour Factor	0.82	0.90	0.75	0.93	0.86	0.69
Shared Lane Traffic (%)						
Lane Group Flow (vph)	220	0	0	924	1080	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	2	
Permitted Phases			2			
Detector Phase	4		2	2	2	
Switch Phase						
Minimum Initial (s)	8.0		16.0	16.0	16.0	
Minimum Split (s)	24.0		34.0	34.0	34.0	
Total Split (s)	30.0		60.0	60.0	60.0	
Total Split (%)	33.3%		66.7%	66.7%	66.7%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		3.0	3.0	3.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	6.0			7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		Min	Min	Min	
Act Effect Green (s)	14.0			45.1	45.1	
Actuated g/C Ratio	0.19			0.62	0.62	
v/c Ratio	0.62			0.52	0.61	
Control Delay	34.1			9.3	10.3	
Queue Delay	0.0			0.0	0.0	
Total Delay	34.1			9.3	10.3	
LOS	C			A	B	
Approach Delay	34.1			9.3	10.3	
Approach LOS	C			A	B	
Queue Length 50th (m)	27.8			32.5	49.9	
Queue Length 95th (m)	44.0			57.4	81.4	
Internal Link Dist (m)	256.8			383.5	389.7	
Turn Bay Length (m)						
Base Capacity (vph)	616			2131	2130	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.36			0.43	0.51	

Timings
2: University Ave & Nassau St

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 72.6

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 12.2

Intersection LOS: B

Intersection Capacity Utilization 71.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: University Ave & Nassau St



Timings 3: University Ave & Kirkwood Dr/Allen St

University Avenue Master Plan Existing Conditions PM Peak


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	237	30	200	233	241	51	523	89	290	523	67
Future Volume (vph)	80	237	30	200	233	241	51	523	89	290	523	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	80.0		80.0	55.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		48			48			48				48
Link Distance (m)		278.5			213.1			138.3				407.5
Travel Time (s)		20.9			16.0			10.4				30.6
Peak Hour Factor	0.75	0.91	0.93	0.84	0.93	0.98	0.73	0.96	0.80	0.91	0.90	0.73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	107	292	0	238	251	246	70	656	0	319	673	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8		8	6			2		
Detector Phase	7	4		3	8	8	1	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	7.0	20.0		7.0	20.0	
Minimum Split (s)	10.0	26.0		10.0	26.0	26.0	10.0	32.0		10.0	32.0	
Total Split (s)	20.0	26.0		24.0	30.0	30.0	18.0	60.0		18.0	60.0	
Total Split (%)	15.6%	20.3%		18.8%	23.4%	23.4%	14.1%	46.9%		14.1%	46.9%	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effct Green (s)	33.6	20.3		42.6	26.2	26.2	55.9	44.9		66.2	54.7	
Actuated g/C Ratio	0.29	0.18		0.37	0.23	0.23	0.49	0.39		0.58	0.48	
v/c Ratio	0.30	0.88		0.71	0.59	0.44	0.24	0.91		1.00	0.76	
Control Delay	28.8	75.5		39.8	48.1	7.9	13.5	50.0		79.8	32.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	28.8	75.5		39.8	48.1	7.9	13.5	50.0		79.8	32.6	
LOS	C	E		D	D	A	B	D		E	C	
Approach Delay		63.0			32.0			46.5			47.7	
Approach LOS		E			C			D			D	
Queue Length 50th (m)	16.8	67.0		40.4	52.7	0.0	6.6	135.8		~57.3	125.0	
Queue Length 95th (m)	25.6	#131.2		60.1	86.5	21.4	10.9	#202.0		#123.5	188.2	
Internal Link Dist (m)		254.5			189.1			114.3			383.5	
Turn Bay Length (m)	45.0			80.0		80.0	55.0					
Base Capacity (vph)	461	330		400	431	556	409	880		320	925	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.23	0.88		0.59	0.58	0.44	0.17	0.75		1.00	0.73	

Timings
 3: University Ave & Kirkwood Dr/Allen St

Intersection Summary

Area Type:	Other
Cycle Length:	128
Actuated Cycle Length:	114.9
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.00
Intersection Signal Delay:	45.5
Intersection LOS:	D
Intersection Capacity Utilization:	91.0%
ICU Level of Service:	F
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 3: University Ave & Kirkwood Dr/Allen St

			
18 s	60 s	24 s	26 s
			
18 s	60 s	20 s	30 s

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	9	2	34	0	0	10	27	646	8	2	688	71
Future Vol, veh/h	9	2	34	0	0	10	27	646	8	2	688	71
Conflicting Peds, #/hr	0	0	0	0	0	0	26	0	0	0	0	26
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	50	66	50	50	75	58	94	58	50	92	73
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	4	52	0	0	13	47	687	14	4	748	97

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1626	1626	823	1621	1667	694	871	0	0	701	0	0
Stage 1	831	831	-	788	788	-	-	-	-	-	-	-
Stage 2	795	795	-	833	879	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	82	102	373	83	96	443	774	-	-	896	-	-
Stage 1	364	384	-	384	402	-	-	-	-	-	-	-
Stage 2	381	399	-	363	365	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	74	93	364	65	88	443	755	-	-	896	-	-
Mov Cap-2 Maneuver	74	93	-	65	88	-	-	-	-	-	-	-
Stage 1	333	373	-	360	377	-	-	-	-	-	-	-
Stage 2	347	374	-	307	355	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	34.8		13.4		0.6		0	
HCM LOS	D		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	755	-	-	188	443	896	-
HCM Lane V/C Ratio	0.062	-	-	0.367	0.03	0.004	-
HCM Control Delay (s)	10.1	-	-	34.8	13.4	9	-
HCM Lane LOS	B	-	-	D	B	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.6	0.1	0	-

Intersection												
Int Delay, s/veh	6.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	21	9	22	3	6	31	8	623	7	27	658	53
Future Vol, veh/h	21	9	22	3	6	31	8	623	7	27	658	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	40	68	38	63	75	58	95	50	64	88	82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	23	32	8	10	41	14	656	14	42	748	65

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1582	1563	781	1583	1588	663	813	0	0	670	0	0
Stage 1	865	865	-	691	691	-	-	-	-	-	-	-
Stage 2	717	698	-	892	897	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	88	112	395	88	108	461	814	-	-	920	-	-
Stage 1	348	371	-	435	446	-	-	-	-	-	-	-
Stage 2	421	442	-	337	358	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	71	105	395	64	101	461	814	-	-	920	-	-
Mov Cap-2 Maneuver	71	105	-	64	101	-	-	-	-	-	-	-
Stage 1	342	354	-	428	438	-	-	-	-	-	-	-
Stage 2	368	434	-	277	342	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	97.6		32		0.2		0.4	
HCM LOS	F		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	814	-	-	116	191	920	-
HCM Lane V/C Ratio	0.017	-	-	0.756	0.308	0.046	-
HCM Control Delay (s)	9.5	-	-	97.6	32	9.1	-
HCM Lane LOS	A	-	-	F	D	A	-
HCM 95th %tile Q(veh)	0.1	-	-	4.2	1.2	0.1	-

Intersection						
Int Delay, s/veh	7.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	70	55	38	579	587	100
Future Vol, veh/h	70	55	38	579	587	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	84	75	87	90	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	65	51	666	652	130

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1485	717	782	0	-	0
Stage 1	717	-	-	-	-	-
Stage 2	768	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	137	430	836	-	-	-
Stage 1	484	-	-	-	-	-
Stage 2	458	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	129	430	836	-	-	-
Mov Cap-2 Maneuver	129	-	-	-	-	-
Stage 1	454	-	-	-	-	-
Stage 2	458	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	81.3	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	836	-	184	-	-
HCM Lane V/C Ratio	0.061	-	0.837	-	-
HCM Control Delay (s)	9.6	-	81.3	-	-
HCM Lane LOS	A	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	6	-	-

Intersection												
Int Delay, s/veh	16.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	32	7	58	5	2	72	37	525	15	74	556	51
Future Vol, veh/h	32	7	58	5	2	72	37	525	15	74	556	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	38	75	33	25	62	57	89	65	89	90	79
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	36	18	77	15	8	116	65	590	23	83	618	65

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1611	1560	651	1596	1581	602	683	0	0	613	0	0
Stage 1	817	817	-	732	732	-	-	-	-	-	-	-
Stage 2	794	743	-	864	849	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	84	112	469	86	109	500	910	-	-	966	-	-
Stage 1	370	390	-	413	427	-	-	-	-	-	-	-
Stage 2	381	422	-	349	377	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	53	95	469	54	93	500	910	-	-	966	-	-
Mov Cap-2 Maneuver	53	95	-	54	93	-	-	-	-	-	-	-
Stage 1	344	356	-	384	397	-	-	-	-	-	-	-
Stage 2	266	392	-	253	345	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	161.1		41.1		0.9		1	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	910	-	-	126	233	966	-
HCM Lane V/C Ratio	0.071	-	-	1.049	0.598	0.086	-
HCM Control Delay (s)	9.3	-	-	161.1	41.1	9.1	-
HCM Lane LOS	A	-	-	F	E	A	-
HCM 95th %tile Q(veh)	0.2	-	-	7.4	3.4	0.3	-

HCM Unsignalized Intersection Capacity Analysis
 8: University Ave & Connolly St

University Avenue Master Plan
 Existing Conditions PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↕	↕	
Traffic Volume (veh/h)	0	0	5	592	585	24
Future Volume (Veh/h)	0	0	5	592	585	24
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.50	0.89	0.92	0.58
Hourly flow rate (vph)	0	0	10	665	636	41
Pedestrians	19					
Lane Width (m)	0.0					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)	379					
pX, platoon unblocked	0.84					
vC, conflicting volume	1360	676	696			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1334	676	696			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	99			
cM capacity (veh/h)	141	454	900			
Direction, Lane #	NB 1	SB 1				
Volume Total	675	677				
Volume Left	10	0				
Volume Right	0	41				
cSH	900	1700				
Volume to Capacity	0.01	0.40				
Queue Length 95th (m)	0.3	0.0				
Control Delay (s)	0.3	0.0				
Lane LOS	A					
Approach Delay (s)	0.3	0.0				
Approach LOS						
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			38.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	13	15	3	564	558	19
Future Vol, veh/h	13	15	3	564	558	19
Conflicting Peds, #/hr	0	0	14	0	0	14
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	65	75	90	90	57
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	23	4	627	620	33

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1286	651	667	0	-	0
Stage 1	651	-	-	-	-	-
Stage 2	635	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	181	469	923	-	-	-
Stage 1	519	-	-	-	-	-
Stage 2	528	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	175	463	911	-	-	-
Mov Cap-2 Maneuver	175	-	-	-	-	-
Stage 1	509	-	-	-	-	-
Stage 2	521	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	911	-	266	-	-
HCM Lane V/C Ratio	0.004	-	0.158	-	-
HCM Control Delay (s)	9	0	21	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Traffic Vol, veh/h	0	0	0	0	2	10	15	575	2	14	519	8
Future Vol, veh/h	0	0	0	0	2	10	15	575	2	14	519	8
Conflicting Peds, #/hr	0	0	0	0	0	0	20	0	1	1	0	20
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	50	75	81	91	50	75	94	35
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	4	13	19	632	4	19	552	23

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1275	1306	635	595	0	0
Stage 1	673	673	-	-	-	-
Stage 2	602	633	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	4.12
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	2.218
Pot Cap-1 Maneuver	184	160	478	981	-	947
Stage 1	507	454	-	-	-	-
Stage 2	547	473	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	173	0	478	981	-	946
Mov Cap-2 Maneuver	173	0	-	-	-	-
Stage 1	491	0	-	-	-	-
Stage 2	531	0	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.8	0.2	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBRWBLn1	SBL	SBT	SBR
Capacity (veh/h)	981	-	-	478	946	-
HCM Lane V/C Ratio	0.019	-	-	0.036	0.02	-
HCM Control Delay (s)	8.7	0	-	12.8	8.9	0
HCM Lane LOS	A	A	-	B	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	-

Timings
11: Great George St/University Ave & Euston St

University Avenue Master Plan
Existing Conditions PM Peak











Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	300	74	49	206	156	137	376	110	140	319	145
Future Volume (vph)	114	300	74	49	206	156	137	376	110	140	319	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	37.0		0.0	30.0		0.0	100.0		0.0	0.0		33.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		48			48			48				48
Link Distance (m)		246.1			265.2			163.4				49.1
Travel Time (s)		18.5			19.9			12.3				3.7
Peak Hour Factor	0.79	0.89	0.67	0.79	0.91	0.88	0.77	0.86	0.85	0.73	0.85	0.89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	144	447	0	62	403	0	178	437	129	192	375	163
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	25.0	25.0	7.0	25.0	25.0
Minimum Split (s)	12.0	27.0		12.0	27.0		12.0	30.0	30.0	12.0	30.0	30.0
Total Split (s)	20.0	35.0		20.0	35.0		20.0	40.0	40.0	20.0	40.0	40.0
Total Split (%)	17.4%	30.4%		17.4%	30.4%		17.4%	34.8%	34.8%	17.4%	34.8%	34.8%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	40.6	31.6		33.7	25.7		41.3	30.0	30.0	42.8	30.7	30.7
Actuated g/C Ratio	0.41	0.32		0.34	0.26		0.42	0.30	0.30	0.43	0.31	0.31
v/c Ratio	0.48	0.76		0.23	0.84		0.46	0.77	0.22	0.57	0.64	0.28
Control Delay	24.5	41.2		20.8	49.8		20.6	43.3	6.2	23.4	37.0	11.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	41.2		20.8	49.8		20.6	43.3	6.2	23.4	37.0	11.5
LOS	C	D		C	D		C	D	A	C	D	B
Approach Delay		37.2			46.0			31.4				27.7
Approach LOS		D			D			C				C
Queue Length 50th (m)	17.1	77.5		7.0	67.8		20.0	79.2	0.0	21.8	63.8	6.9
Queue Length 95th (m)	28.2	#130.1		14.0	#129.2		30.4	118.6	11.4	30.7	97.9	23.5
Internal Link Dist (m)		222.1			241.2			139.4				25.1
Turn Bay Length (m)	37.0			30.0			100.0					33.0
Base Capacity (vph)	367	605		400	567		452	680	660	395	685	654
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.74		0.15	0.71		0.39	0.64	0.20	0.49	0.55	0.25

Timings
 11: Great George St/University Ave & Euston St

Intersection Summary

Area Type:	Other		
Cycle Length:	115		
Actuated Cycle Length:	99.1		
Natural Cycle:	85		
Control Type:	Actuated-Uncoordinated		
Maximum v/c Ratio:	0.84		
Intersection Signal Delay:	34.4	Intersection LOS:	C
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 11: Great George St/University Ave & Euston St

 Ø1	 Ø2	 Ø3	 Ø4
20 s	40 s	20 s	35 s
 Ø5	 Ø6	 Ø7	 Ø8
20 s	40 s	20 s	35 s

Appendix 4 – Synchro Reports – with Improvements

- Noon Peak
- PM Peak

Timings
1: University Ave & Belvedere Ave

University Avenue Master Plan
Noon Peak with Improvements

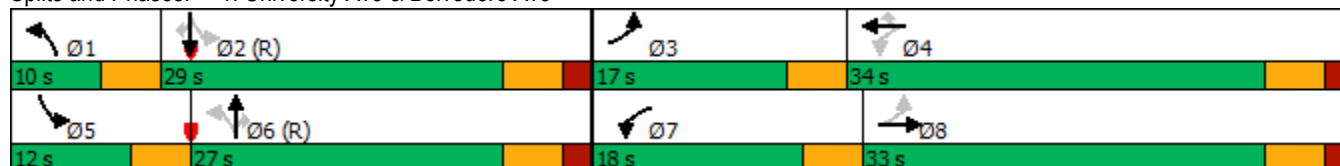
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	268	353	44	257	261	149	76	502	179	208	667	135
Future Volume (vph)	268	353	44	257	261	149	76	502	179	208	667	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.5	3.3	3.3	3.5	3.3
Storage Length (m)	55.0		0.0	100.0		25.0	75.0		25.0	300.0		15.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		172.7			115.1			111.9			604.0	
Travel Time (s)		13.0			8.6			8.4			45.3	
Peak Hour Factor	0.91	0.92	0.59	0.79	0.80	0.93	0.77	0.87	0.78	0.97	0.93	0.76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	295	459	0	325	326	160	99	577	229	214	717	178
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		2
Detector Phase	3	8		7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	6.0	12.0		6.0	12.0	12.0	6.0	20.0	20.0	6.0	19.0	19.0
Minimum Split (s)	12.0	30.0		12.0	30.0	30.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	17.0	33.0		18.0	34.0	34.0	10.0	27.0	27.0	12.0	29.0	29.0
Total Split (%)	18.9%	36.7%		20.0%	37.8%	37.8%	11.1%	30.0%	30.0%	13.3%	32.2%	32.2%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	40.1	25.6		43.1	27.1	27.1	30.2	22.0	22.0	34.8	26.2	26.2
Actuated g/C Ratio	0.45	0.28		0.48	0.30	0.30	0.34	0.24	0.24	0.39	0.29	0.29
v/c Ratio	0.63	0.91		0.88	0.60	0.29	0.42	0.68	0.46	0.74	0.70	0.33
Control Delay	19.9	53.4		45.1	32.0	7.8	22.4	32.5	9.7	38.0	34.3	10.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	53.4		45.1	32.0	7.8	22.4	32.5	9.7	38.0	34.3	10.4
LOS	B	D		D	C	A	C	C	A	D	C	B
Approach Delay		40.3			32.5			25.6			31.2	
Approach LOS		D			C			C			C	
Queue Length 50th (m)	27.9	72.8		34.5	47.1	3.3	11.7	49.4	10.1	25.3	61.1	6.0
Queue Length 95th (m)	44.5	#125.2		#59.8	63.0	16.8	14.0	36.9	7.5	#46.8	#81.9	15.0
Internal Link Dist (m)		148.7			91.1			87.9			580.0	
Turn Bay Length (m)	55.0			100.0		25.0	75.0		25.0	300.0		15.0
Base Capacity (vph)	480	534		368	560	567	235	853	501	288	1018	540
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.86		0.88	0.58	0.28	0.42	0.68	0.46	0.74	0.70	0.33

Timings
 1: University Ave & Belvedere Ave

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 32.0 Intersection LOS: C
 Intersection Capacity Utilization 80.3% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: University Ave & Belvedere Ave



Timings
2: University Ave & Nassau St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	124	76	36	751	792	90
Future Volume (vph)	124	76	36	751	792	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.3	3.3	3.3	3.3	3.3
Storage Length (m)	40.0	0.0	0.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	10.0		10.0			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	48			48	48	
Link Distance (m)	279.4			92.6	234.6	
Travel Time (s)	21.0			6.9	17.6	
Confl. Peds. (#/hr)			25			25
Peak Hour Factor	0.82	0.76	0.59	0.91	0.91	0.80
Shared Lane Traffic (%)						
Lane Group Flow (vph)	151	100	61	825	983	0
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	16.0	16.0	
Minimum Split (s)	29.0	29.0	10.0	34.0	34.0	
Total Split (s)	29.0	29.0	10.0	46.0	36.0	
Total Split (%)	38.7%	38.7%	13.3%	61.3%	48.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	3.0	3.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	5.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?						
Recall Mode	None	None	None	Min	Min	
Act Effect Green (s)	10.9	10.9	36.7	34.6	29.2	
Actuated g/C Ratio	0.19	0.19	0.62	0.59	0.50	
v/c Ratio	0.48	0.27	0.23	0.41	0.73	
Control Delay	27.7	7.8	6.7	7.4	17.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.7	7.8	6.7	7.4	17.6	
LOS	C	A	A	A	B	
Approach Delay	19.7			7.4	17.6	
Approach LOS	B			A	B	
Queue Length 50th (m)	16.1	0.0	2.1	21.4	57.3	
Queue Length 95th (m)	27.8	6.8	4.1	37.6	#109.4	
Internal Link Dist (m)	255.4			68.6	210.6	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	684	672	271	2321	1421	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	

Timings
 2: University Ave & Nassau St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Reduced v/c Ratio	0.22	0.15	0.23	0.36	0.69	

Intersection Summary

Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	58.8
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	13.6
Intersection LOS:	B
Intersection Capacity Utilization	47.6%
ICU Level of Service	A
Analysis Period (min)	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: University Ave & Nassau St



Timings
3: University Ave & Kirkwood Dr/Allen St

University Avenue Master Plan
Noon Peak with Improvements



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	221	35	181	189	228	31	484	91	275	566	70
Future Volume (vph)	84	221	35	181	189	228	31	484	91	275	566	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.5	3.3	3.3	3.5	3.3
Storage Length (m)	45.0		0.0	0.0		80.0	55.0		20.0	0.0		15.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		278.5			117.9			138.3			314.8	
Travel Time (s)		20.9			8.8			10.4			23.6	
Peak Hour Factor	0.75	0.88	0.67	0.75	0.95	0.93	0.81	0.88	0.81	0.94	0.92	0.74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	303	0	241	199	245	38	662	0	293	615	95
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8		8	6			2		2
Detector Phase	7	4		3	8	8	1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	10.0		6.0	10.0	10.0	6.0	20.0		7.0	20.0	20.0
Minimum Split (s)	9.0	26.0		10.0	26.0	26.0	10.0	32.0		11.0	32.0	32.0
Total Split (s)	10.0	26.0		15.0	31.0	31.0	10.0	37.0		22.0	49.0	49.0
Total Split (%)	10.0%	26.0%		15.0%	31.0%	31.0%	10.0%	37.0%		22.0%	49.0%	49.0%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	Min		None	Min	Min
Act Effect Green (s)	26.3	18.2		35.2	25.4	25.4	34.2	26.1		47.1	39.6	39.6
Actuated g/C Ratio	0.29	0.20		0.39	0.28	0.28	0.38	0.29		0.52	0.44	0.44
v/c Ratio	0.30	0.84		0.73	0.39	0.40	0.14	0.66		0.68	0.76	0.12
Control Delay	23.3	56.8		37.0	31.9	6.3	13.1	31.0		21.4	30.3	0.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	23.3	56.8		37.0	31.9	6.3	13.1	31.0		21.4	30.3	0.5
LOS	C	E		D	C	A	B	C		C	C	A
Approach Delay		47.8			24.5			30.0			24.9	
Approach LOS		D			C			C			C	
Queue Length 50th (m)	13.1	51.4		30.6	30.1	0.0	3.2	52.2		29.1	99.4	0.0
Queue Length 95th (m)	21.6	#95.9		43.1	53.3	18.0	6.9	71.3		45.5	143.9	0.0
Internal Link Dist (m)		254.5			93.9			114.3			290.8	
Turn Bay Length (m)	45.0					80.0	55.0					15.0
Base Capacity (vph)	369	400		331	516	613	270	1208		477	887	822
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.30	0.76		0.73	0.39	0.40	0.14	0.55		0.61	0.69	0.12

Timings
 3: University Ave & Kirkwood Dr/Allen St

Intersection Summary

Area Type:	Other		
Cycle Length:	100		
Actuated Cycle Length:	90.4		
Natural Cycle:	80		
Control Type:	Actuated-Uncoordinated		
Maximum v/c Ratio:	0.84		
Intersection Signal Delay:	29.5	Intersection LOS:	C
Intersection Capacity Utilization:	75.2%	ICU Level of Service:	D
Analysis Period (min):	15		
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.			

Splits and Phases: 3: University Ave & Kirkwood Dr/Allen St



Timings
6: University Ave & Pond St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	124	46	23	583	567	123
Future Volume (vph)	124	46	23	583	567	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.3	3.3	3.5	3.5	3.3
Storage Length (m)	0.0	30.0	20.0			20.0
Storage Lanes	1	1	1			1
Taper Length (m)	10.0		10.0			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	48			48	48	
Link Distance (m)	243.7			76.8	63.3	
Travel Time (s)	18.3			5.8	4.7	
Peak Hour Factor	0.79	0.84	0.75	0.87	0.90	0.77
Shared Lane Traffic (%)						
Lane Group Flow (vph)	157	55	31	670	630	160
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.0	22.0	8.0	22.0	22.0	22.0
Total Split (s)	26.0	26.0	8.0	74.0	66.0	66.0
Total Split (%)	26.0%	26.0%	8.0%	74.0%	66.0%	66.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	0.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	3.0	5.0	5.0	5.0
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effect Green (s)	14.4	14.4	79.8	75.6	70.4	70.4
Actuated g/C Ratio	0.14	0.14	0.80	0.76	0.70	0.70
v/c Ratio	0.64	0.21	0.05	0.48	0.49	0.15
Control Delay	51.7	11.5	3.6	6.6	9.7	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.7	11.5	3.6	6.6	9.7	3.7
LOS	D	B	A	A	A	A
Approach Delay	41.3			6.5	8.5	
Approach LOS	D			A	A	
Queue Length 50th (m)	29.1	0.0	1.1	41.0	54.6	4.5
Queue Length 95th (m)	40.0	8.6	3.1	72.0	95.7	10.2
Internal Link Dist (m)	219.7			52.8	39.3	
Turn Bay Length (m)		30.0	20.0			20.0
Base Capacity (vph)	359	364	575	1393	1296	1102
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.15	0.05	0.48	0.49	0.15

Timings
 6: University Ave & Pond St

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	35 (35%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	11.7
Intersection LOS:	B
Intersection Capacity Utilization	45.9%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 6: University Ave & Pond St



Timings
10: Great George St/University Ave & Euston St

University Avenue Master Plan
Noon Peak with Improvements









Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	240	58	35	226	176	107	298	37	144	283	160
Future Volume (vph)	115	240	58	35	226	176	107	298	37	144	283	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	37.0		0.0	30.0		0.0	100.0		60.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		48			48			48				48
Link Distance (m)		246.1			265.2			123.7				49.1
Travel Time (s)		18.5			19.9			9.3				3.7
Peak Hour Factor	0.73	0.91	0.75	0.66	0.89	0.88	0.77	0.90	0.75	0.86	0.92	0.85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	341	0	53	454	0	139	331	49	167	308	188
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	25.0	25.0	7.0	25.0	25.0
Minimum Split (s)	12.0	27.0		12.0	27.0		12.0	30.0	30.0	12.0	30.0	30.0
Total Split (s)	12.0	29.0		12.0	29.0		12.0	31.0	31.0	13.0	32.0	32.0
Total Split (%)	14.1%	34.1%		14.1%	34.1%		14.1%	36.5%	36.5%	15.3%	37.6%	37.6%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	31.3	27.2		29.2	22.2		32.2	25.2	25.2	33.8	26.0	26.0
Actuated g/C Ratio	0.38	0.33		0.35	0.27		0.39	0.31	0.31	0.41	0.32	0.32
v/c Ratio	0.64	0.56		0.14	0.89		0.35	0.57	0.08	0.43	0.52	0.30
Control Delay	30.0	27.3		15.5	47.9		16.3	29.3	0.3	17.6	27.2	4.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	27.3		15.5	47.9		16.3	29.3	0.3	17.6	27.2	4.9
LOS	C	C		B	D		B	C	A	B	C	A
Approach Delay		28.1			44.5			23.1			18.4	
Approach LOS		C			D			C			B	
Queue Length 50th (m)	15.4	45.2		4.9	61.9		12.7	44.9	0.0	15.6	40.4	0.0
Queue Length 95th (m)	22.1	73.8		8.2	#111.8		19.5	70.6	0.0	25.9	64.2	11.3
Internal Link Dist (m)		222.1			241.2			99.7			25.1	
Turn Bay Length (m)	37.0			30.0			100.0		60.0	15.0		
Base Capacity (vph)	245	613		371	546		401	595	611	390	618	652
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.56		0.14	0.83		0.35	0.56	0.08	0.43	0.50	0.29

Timings
 10: Great George St/University Ave & Euston St

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	82.3
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.89
Intersection Signal Delay:	27.8
Intersection LOS:	C
Intersection Capacity Utilization:	74.5%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 10: Great George St/University Ave & Euston St

			
12 s	32 s	12 s	29 s
			
13 s	31 s	12 s	29 s

Timings
41: University Ave & Indigo

University Avenue Master Plan
Noon Peak with Improvements



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	0	25	5	0	5	120	670	5	5	850	35
Future Volume (vph)	80	0	25	5	0	5	120	670	5	5	850	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.5	3.3	3.3	3.5	3.3
Storage Length (m)	25.0		0.0	25.0		0.0	0.0		60.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		42.3			81.2			234.6			71.1	
Travel Time (s)		3.2			6.1			17.6			5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	27	0	5	5	0	130	733	0	5	962	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		10.0	24.0		10.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0		16.0	55.0		10.0	49.0	
Total Split (%)	27.8%	27.8%		27.8%	27.8%		17.8%	61.1%		11.1%	54.4%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	6.0		5.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	
Act Effect Green (s)	11.1	11.1		11.0	11.0		70.8	69.2		64.4	57.8	
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.79	0.77		0.72	0.64	
v/c Ratio	0.52	0.07		0.03	0.01		0.29	0.27		0.01	0.43	
Control Delay	47.1	0.4		32.4	0.0		4.8	5.2		3.4	6.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	47.1	0.4		32.4	0.0		4.8	5.2		3.4	6.5	
LOS	D	A		C	A		A	A		A	A	
Approach Delay		36.0			16.2			5.1			6.5	
Approach LOS		D			B			A			A	
Queue Length 50th (m)	14.3	0.0		0.8	0.0		4.5	16.5		0.2	26.3	
Queue Length 95th (m)	27.2	0.0		3.7	0.0		10.9	43.6		m0.3	m34.3	
Internal Link Dist (m)		18.3			57.2			210.6			47.1	
Turn Bay Length (m)	25.0			25.0						15.0		
Base Capacity (vph)	301	501		296	558		497	2687		545	2238	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.29	0.05		0.02	0.01		0.26	0.27		0.01	0.43	

Timings
 41: University Ave & Indigo

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 10 (11%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.52
 Intersection Signal Delay: 7.7 Intersection LOS: A
 Intersection Capacity Utilization 55.7% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 41: University Ave & Indigo



Timings
1: University Ave & Belvedere Ave

University Avenue Master Plan
PM Peak with Improvements

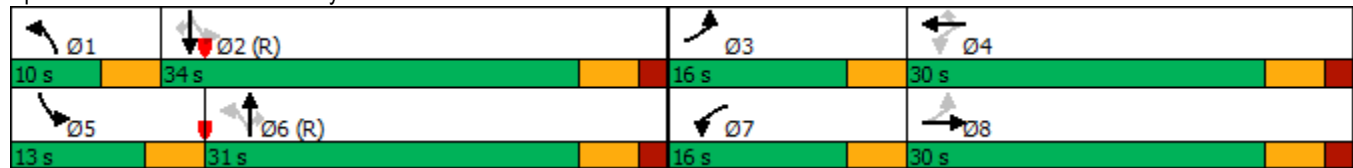
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	291	322	33	304	300	201	89	695	161	225	608	168
Future Volume (vph)	291	322	33	304	300	201	89	695	161	225	608	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.5	3.3	3.3	3.5	3.3
Storage Length (m)	55.0		0.0	100.0		25.0	75.0		25.0	300.0		15.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		172.7			115.1			111.9			604.0	
Travel Time (s)		13.0			8.6			8.4			45.3	
Peak Hour Factor	0.88	0.96	0.70	0.93	0.96	0.86	0.95	0.92	0.84	0.89	0.89	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	331	382	0	327	313	234	94	755	192	253	683	187
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		2
Detector Phase	3	8		7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	6.0	12.0		6.0	12.0	12.0	6.0	20.0	20.0	6.0	19.0	19.0
Minimum Split (s)	12.0	30.0		12.0	30.0	30.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	16.0	30.0		16.0	30.0	30.0	10.0	31.0	31.0	13.0	34.0	34.0
Total Split (%)	17.8%	33.3%		17.8%	33.3%	33.3%	11.1%	34.4%	34.4%	14.4%	37.8%	37.8%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	36.4	22.2		37.1	22.5	22.5	33.3	25.0	25.0	40.6	31.0	31.0
Actuated g/C Ratio	0.40	0.25		0.41	0.25	0.25	0.37	0.28	0.28	0.45	0.34	0.34
v/c Ratio	0.81	0.87		0.92	0.70	0.46	0.32	0.78	0.37	0.87	0.57	0.31
Control Delay	34.7	52.3		52.4	39.4	11.2	13.9	31.1	6.5	49.5	27.4	9.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	52.3		52.4	39.4	11.2	13.9	31.1	6.5	49.5	27.4	9.5
LOS	C	D		D	D	B	B	C	A	D	C	A
Approach Delay		44.1			36.7			25.0			29.4	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	36.4	60.4		35.9	48.0	7.8	6.0	64.7	9.4	27.6	52.8	6.6
Queue Length 95th (m)	#54.3	#104.1		#82.5	75.3	23.7	8.0	31.6	4.6	#69.7	69.8	21.8
Internal Link Dist (m)		148.7			91.1			87.9			580.0	
Turn Bay Length (m)	55.0			100.0		25.0	75.0		25.0	300.0		15.0
Base Capacity (vph)	410	477		355	480	536	298	976	523	290	1203	613
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.80		0.92	0.65	0.44	0.32	0.77	0.37	0.87	0.57	0.31

Timings
 1: University Ave & Belvedere Ave

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.92
Intersection Signal Delay:	32.7
Intersection LOS:	C
Intersection Capacity Utilization	84.1%
ICU Level of Service	E
Analysis Period (min)	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: University Ave & Belvedere Ave



Timings
2: University Ave & Nassau St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	130	55	38	812	824	84
Future Volume (vph)	130	55	38	812	824	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.3	3.3	3.3	3.3	3.3
Storage Length (m)	40.0	0.0	0.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	10.0		10.0			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	48			48	48	
Link Distance (m)	279.4			92.6	234.6	
Travel Time (s)	21.0			6.9	17.6	
Confl. Peds. (#/hr)			25			25
Peak Hour Factor	0.82	0.90	0.75	0.93	0.86	0.69
Shared Lane Traffic (%)						
Lane Group Flow (vph)	159	61	51	873	1080	0
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	16.0	16.0	
Minimum Split (s)	29.0	29.0	10.0	34.0	34.0	
Total Split (s)	29.0	29.0	10.0	46.0	36.0	
Total Split (%)	38.7%	38.7%	13.3%	61.3%	48.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Min	Min	
Act Effect Green (s)	11.1	11.1	40.1	39.7	34.4	
Actuated g/C Ratio	0.19	0.19	0.69	0.69	0.60	
v/c Ratio	0.48	0.18	0.17	0.37	0.67	
Control Delay	27.9	8.1	5.7	6.4	16.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.9	8.1	5.7	6.4	16.2	
LOS	C	A	A	A	B	
Approach Delay	22.4			6.3	16.2	
Approach LOS	C			A	B	
Queue Length 50th (m)	17.0	0.0	1.7	22.1	65.3	
Queue Length 95th (m)	29.0	8.1	4.6	39.3	#115.3	
Internal Link Dist (m)	255.4			68.6	210.6	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	702	664	305	2443	1618	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	

Timings
2: University Ave & Nassau St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Reduced v/c Ratio	0.23	0.09	0.17	0.36	0.67	

Intersection Summary
























Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	57.8
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.67
Intersection Signal Delay:	12.7
Intersection LOS:	B
Intersection Capacity Utilization	48.8%
ICU Level of Service	A
Analysis Period (min)	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: University Ave & Nassau St



Timings
3: University Ave & Kirkwood Dr/Allen St

University Avenue Master Plan
PM Peak with Improvements

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	237	30	200	233	241	51	523	89	290	523	67
Future Volume (vph)	80	237	30	200	233	241	51	523	89	290	523	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.5	3.3	3.3	3.5	3.3
Storage Length (m)	45.0		0.0	0.0		80.0	55.0		20.0	0.0		15.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		278.5			117.9			138.3			314.8	
Travel Time (s)		20.9			8.8			10.4			23.6	
Peak Hour Factor	0.75	0.91	0.93	0.84	0.93	0.98	0.73	0.96	0.80	0.91	0.90	0.73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	107	292	0	238	251	246	70	656	0	319	581	92
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8		8	6			2		2
Detector Phase	7	4		3	8	8	1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	10.0		6.0	10.0	10.0	6.0	20.0		7.0	20.0	20.0
Minimum Split (s)	9.0	26.0		10.0	26.0	26.0	10.0	32.0		11.0	32.0	32.0
Total Split (s)	11.0	26.0		11.0	26.0	26.0	10.0	38.0		15.0	43.0	43.0
Total Split (%)	12.2%	28.9%		12.2%	28.9%	28.9%	11.1%	42.2%		16.7%	47.8%	47.8%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	Min		None	Min	Min
Act Effct Green (s)	25.9	17.0		27.1	19.6	19.6	34.6	26.5		43.7	33.9	33.9
Actuated g/C Ratio	0.32	0.21		0.33	0.24	0.24	0.42	0.32		0.53	0.41	0.41
v/c Ratio	0.30	0.78		0.81	0.58	0.44	0.24	0.58		0.76	0.76	0.13
Control Delay	21.1	46.8		45.9	36.0	7.0	12.4	24.5		26.1	29.8	1.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	21.1	46.8		45.9	36.0	7.0	12.4	24.5		26.1	29.8	1.7
LOS	C	D		D	D	A	B	C		C	C	A
Approach Delay		39.9			29.5			23.3			26.0	
Approach LOS		D			C			C			C	
Queue Length 50th (m)	11.4	43.6		27.7	37.2	0.0	5.3	44.0		28.4	83.0	0.0
Queue Length 95th (m)	19.2	#80.6		#56.7	63.8	17.9	9.1	60.8		#56.8	125.3	0.7
Internal Link Dist (m)		254.5			93.9			114.3			290.8	
Turn Bay Length (m)	45.0					80.0	55.0					15.0
Base Capacity (vph)	362	441		293	457	571	291	1364		417	841	771
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.30	0.66		0.81	0.55	0.43	0.24	0.48		0.76	0.69	0.12

Timings
 3: University Ave & Kirkwood Dr/Allen St

Intersection Summary

Area Type:	Other		
Cycle Length:	90		
Actuated Cycle Length:	81.9		
Natural Cycle:	80		
Control Type:	Actuated-Uncoordinated		
Maximum v/c Ratio:	0.81		
Intersection Signal Delay:	28.2	Intersection LOS:	C
Intersection Capacity Utilization:	75.4%	ICU Level of Service:	D
Analysis Period (min):	15		
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.			

Splits and Phases: 3: University Ave & Kirkwood Dr/Allen St

			
10 s	43 s	11 s	26 s
			
15 s	38 s	11 s	26 s

Timings
6: University Ave & Pond St

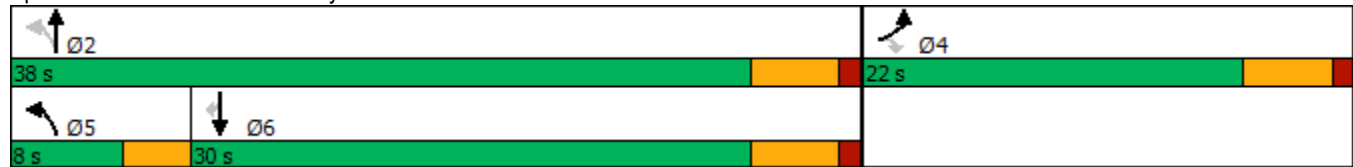


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	140	55	38	579	587	100
Future Volume (vph)	140	55	38	579	587	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.3	3.3	3.5	3.5	3.3
Storage Length (m)	0.0	30.0	20.0			20.0
Storage Lanes	1	1	1			1
Taper Length (m)	10.0		10.0			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	48			48	48	
Link Distance (m)	243.7			76.8	63.3	
Travel Time (s)	18.3			5.8	4.7	
Peak Hour Factor	0.79	0.84	0.75	0.87	0.90	0.77
Shared Lane Traffic (%)						
Lane Group Flow (vph)	177	65	51	666	652	130
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.0	22.0	8.0	22.0	22.0	22.0
Total Split (s)	22.0	22.0	8.0	38.0	30.0	30.0
Total Split (%)	36.7%	36.7%	13.3%	63.3%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	0.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	3.0	5.0	5.0	5.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
Act Effect Green (s)	10.6	10.6	32.0	31.4	27.4	27.4
Actuated g/C Ratio	0.22	0.22	0.67	0.66	0.58	0.58
v/c Ratio	0.46	0.17	0.12	0.55	0.61	0.14
Control Delay	22.2	6.7	4.9	9.1	15.9	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	6.7	4.9	9.1	15.9	5.5
LOS	C	A	A	A	B	A
Approach Delay	18.1			8.8	14.2	
Approach LOS	B			A	B	
Queue Length 50th (m)	15.4	0.0	1.4	32.4	48.4	2.8
Queue Length 95th (m)	25.7	6.3	4.2	67.8	#113.0	8.9
Internal Link Dist (m)	219.7			52.8	39.3	
Turn Bay Length (m)		30.0	20.0			20.0
Base Capacity (vph)	653	625	441	1323	1034	892
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.10	0.12	0.50	0.63	0.15

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 47.5
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay: 12.5 Intersection LOS: B
 Intersection Capacity Utilization 47.7% ICU Level of Service A
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 6: University Ave & Pond St



Timings
10: Great George St/University Ave & Euston St

University Avenue Master Plan
PM Peak with Improvements









Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	300	74	49	206	156	137	376	110	140	319	145
Future Volume (vph)	114	300	74	49	206	156	137	376	110	140	319	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	37.0		0.0	30.0		0.0	100.0		60.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		48			48			48				48
Link Distance (m)		246.1			265.2			123.7				49.1
Travel Time (s)		18.5			19.9			9.3				3.7
Peak Hour Factor	0.79	0.89	0.67	0.79	0.91	0.88	0.77	0.86	0.85	0.73	0.85	0.89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	144	447	0	62	403	0	178	437	129	192	375	163
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	25.0	25.0	7.0	25.0	25.0
Minimum Split (s)	12.0	27.0		12.0	27.0		12.0	30.0	30.0	12.0	30.0	30.0
Total Split (s)	12.0	29.0		12.0	29.0		12.0	32.0	32.0	12.0	32.0	32.0
Total Split (%)	14.1%	34.1%		14.1%	34.1%		14.1%	37.6%	37.6%	14.1%	37.6%	37.6%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	29.6	24.2		28.5	21.5		32.9	25.8	25.8	32.9	25.8	25.8
Actuated g/C Ratio	0.36	0.30		0.35	0.26		0.40	0.32	0.32	0.40	0.32	0.32
v/c Ratio	0.53	0.81		0.24	0.81		0.51	0.73	0.21	0.63	0.63	0.26
Control Delay	23.2	40.1		16.9	39.0		19.7	33.9	3.5	25.4	29.9	5.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	40.1		16.9	39.0		19.7	33.9	3.5	25.4	29.9	5.0
LOS	C	D		B	D		B	C	A	C	C	A
Approach Delay		36.0			36.0			25.2			23.1	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	13.6	63.2		5.6	51.1		16.7	62.5	0.0	18.2	51.4	0.0
Queue Length 95th (m)	22.2	#113.2		11.2	#93.9		24.2	89.4	6.7	24.4	73.7	12.2
Internal Link Dist (m)		222.1			241.2			99.7			25.1	
Turn Bay Length (m)	37.0			30.0			100.0		60.0	15.0		
Base Capacity (vph)	272	558		263	552		352	626	635	303	626	641
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.80		0.24	0.73		0.51	0.70	0.20	0.63	0.60	0.25

Timings
 10: Great George St/University Ave & Euston St

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	81.4
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.81
Intersection Signal Delay:	29.1
Intersection LOS:	C
Intersection Capacity Utilization:	71.9%
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 10: Great George St/University Ave & Euston St

			
12 s	32 s	12 s	29 s
			
12 s	32 s	12 s	29 s

Timings
41: University Ave & Indigo

University Avenue Master Plan
PM Peak with Improvements



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	0	25	5	0	5	100	840	5	5	875	50
Future Volume (vph)	95	0	25	5	0	5	100	840	5	5	875	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.5	3.3	3.3	3.5	3.3
Storage Length (m)	25.0		0.0	25.0		0.0	0.0		60.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		42.3			81.2			234.6			71.1	
Travel Time (s)		3.2			6.1			17.6			5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	27	0	5	5	0	109	918	0	5	1005	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		10.0	24.0		10.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0		16.0	55.0		10.0	49.0	
Total Split (%)	27.8%	27.8%		27.8%	27.8%		17.8%	61.1%		11.1%	54.4%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	6.0		5.0	6.0	
Lead/Lag							Lead	Lead		Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	
Act Effect Green (s)	12.1	12.1		11.8	11.8		67.0	67.2		60.8	60.0	
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.74	0.75		0.68	0.67	
v/c Ratio	0.57	0.06		0.03	0.01		0.27	0.35		0.01	0.43	
Control Delay	47.6	0.2		31.2	0.0		7.8	7.1		7.2	7.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	47.6	0.2		31.2	0.0		7.8	7.1		7.2	7.3	
LOS	D	A		C	A		A	A		A	A	
Approach Delay		37.8			15.6			7.2			7.3	
Approach LOS		D			B			A			A	
Queue Length 50th (m)	16.9	0.0		0.8	0.0		4.0	23.6		0.3	31.5	
Queue Length 95th (m)	30.7	0.0		3.6	0.0		17.7	70.0		m0.3	m31.9	
Internal Link Dist (m)		18.3			57.2			210.6			47.1	
Turn Bay Length (m)	25.0			25.0						15.0		
Base Capacity (vph)	301	580		296	495		453	2639		464	2319	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.34	0.05		0.02	0.01		0.24	0.35		0.01	0.43	

Timings
 41: University Ave & Indigo

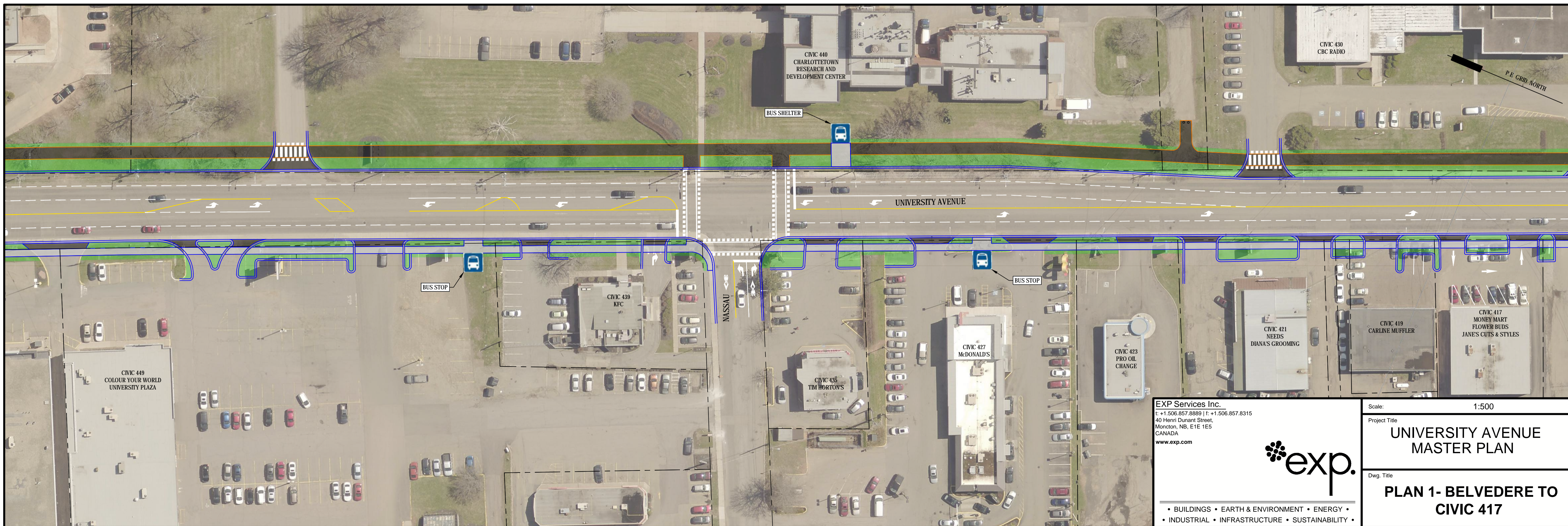
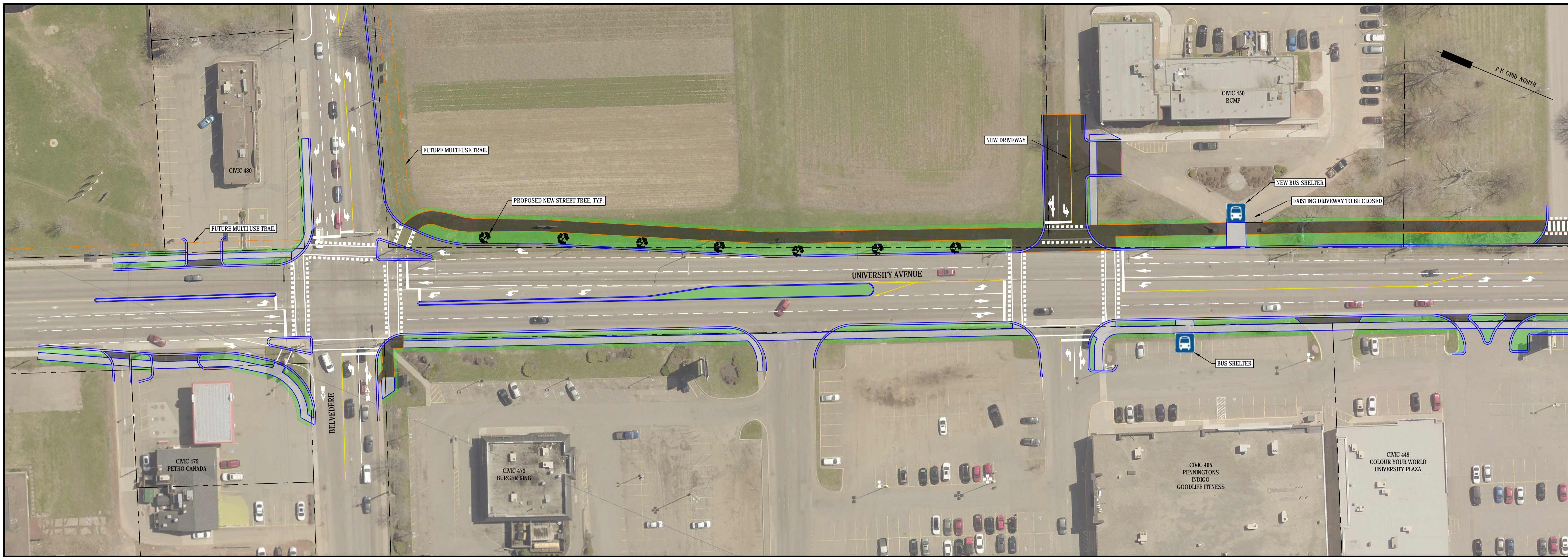
Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 11 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 9.1 Intersection LOS: A
 Intersection Capacity Utilization 56.6% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 41: University Ave & Indigo



Appendix 5 –
The Concept for University Avenue



EXP Services Inc.
 T: +1.506.857.8889 | F: +1.506.857.8315
 40 Henri Dunant Street,
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 www.exp.com

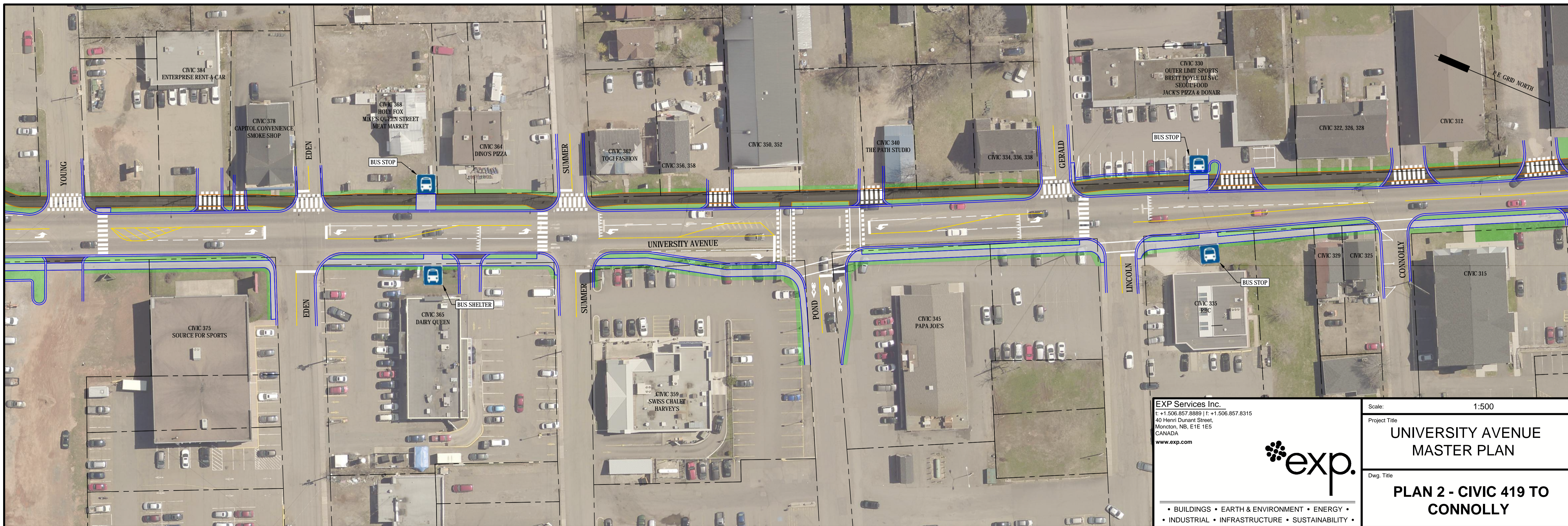
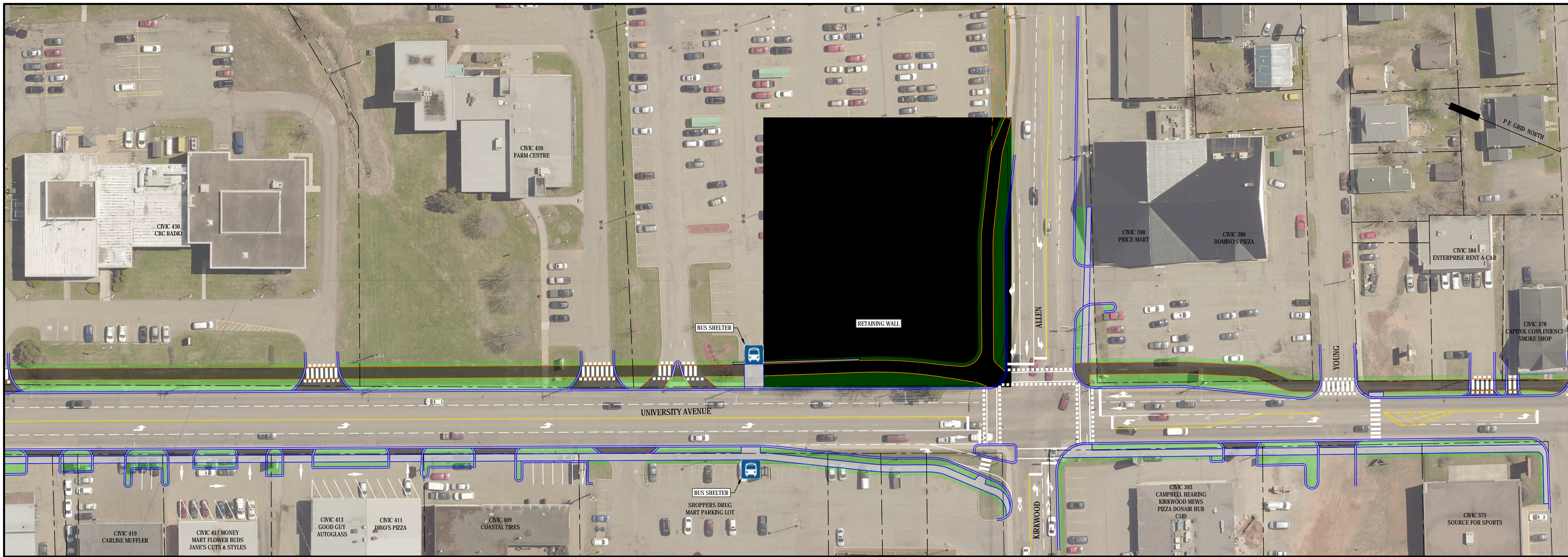


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Project Title
**UNIVERSITY AVENUE
 MASTER PLAN**

Dwg. Title
**PLAN 1- BELVEDERE TO
 CIVIC 417**



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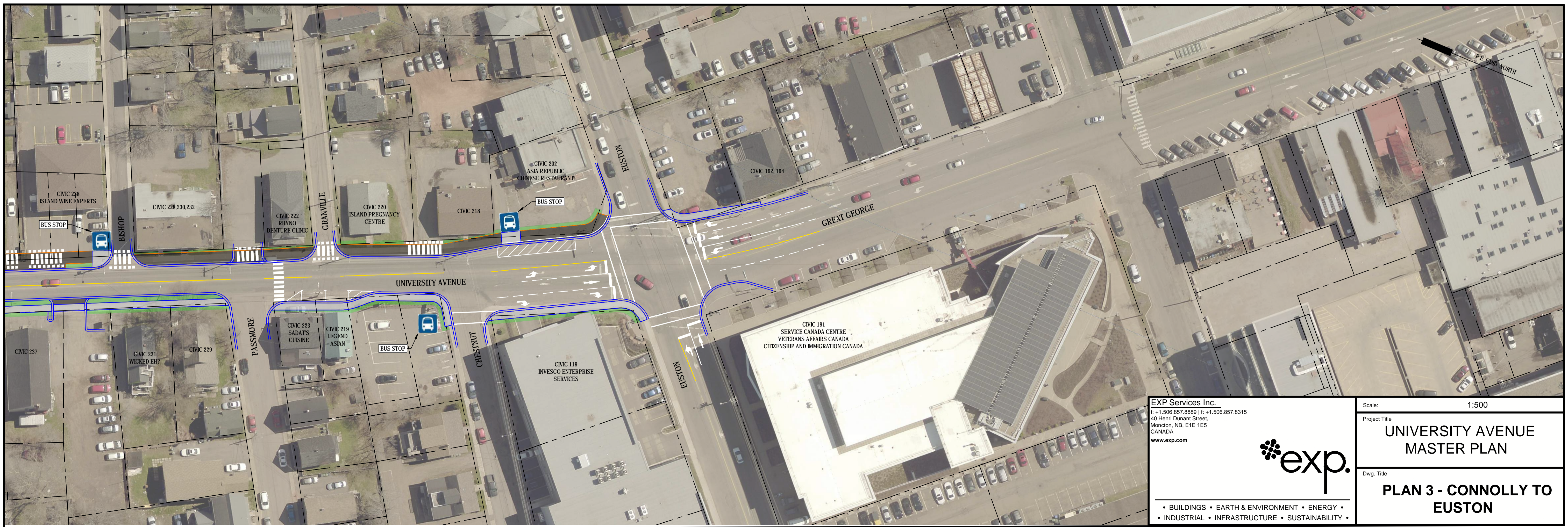
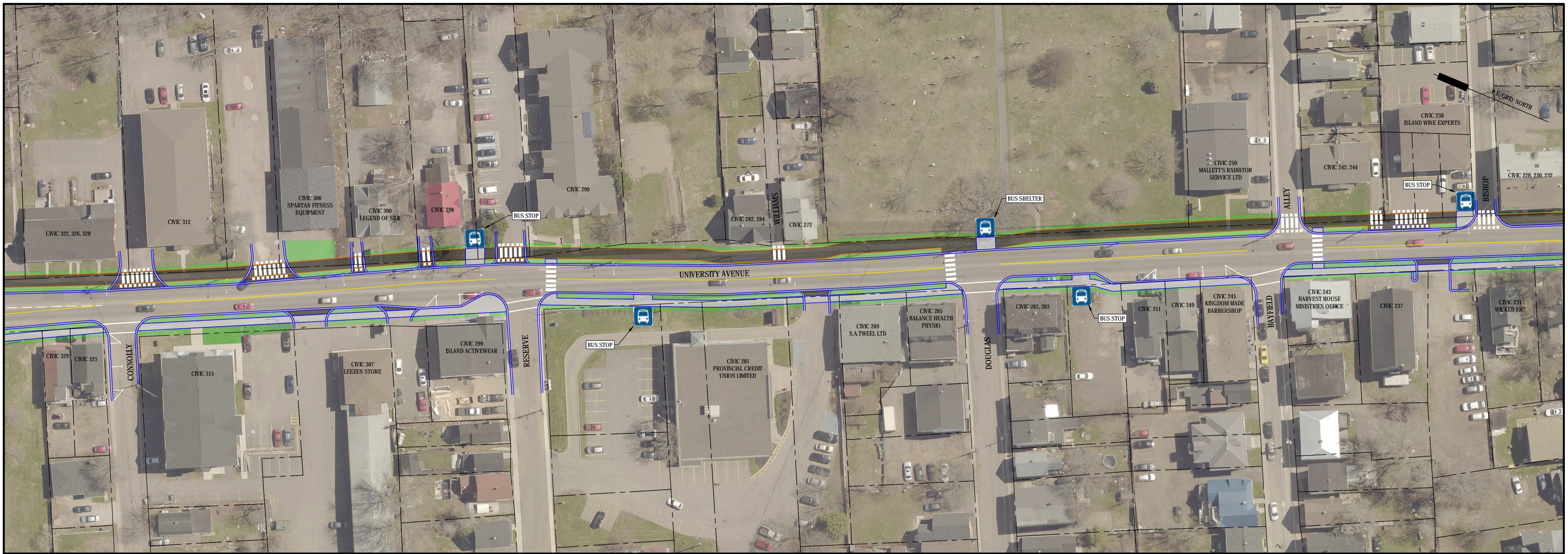


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Project Title
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Dwg. Title
**PLAN 2 - CIVIC 419 TO
 CONNOLLY**



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Appendix 6 –
Proposed Property Lines Drawings



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**PROPOSED PROPERTY LINES
 PLAN 1- BELVEDERE
 TO CIVIC 417**



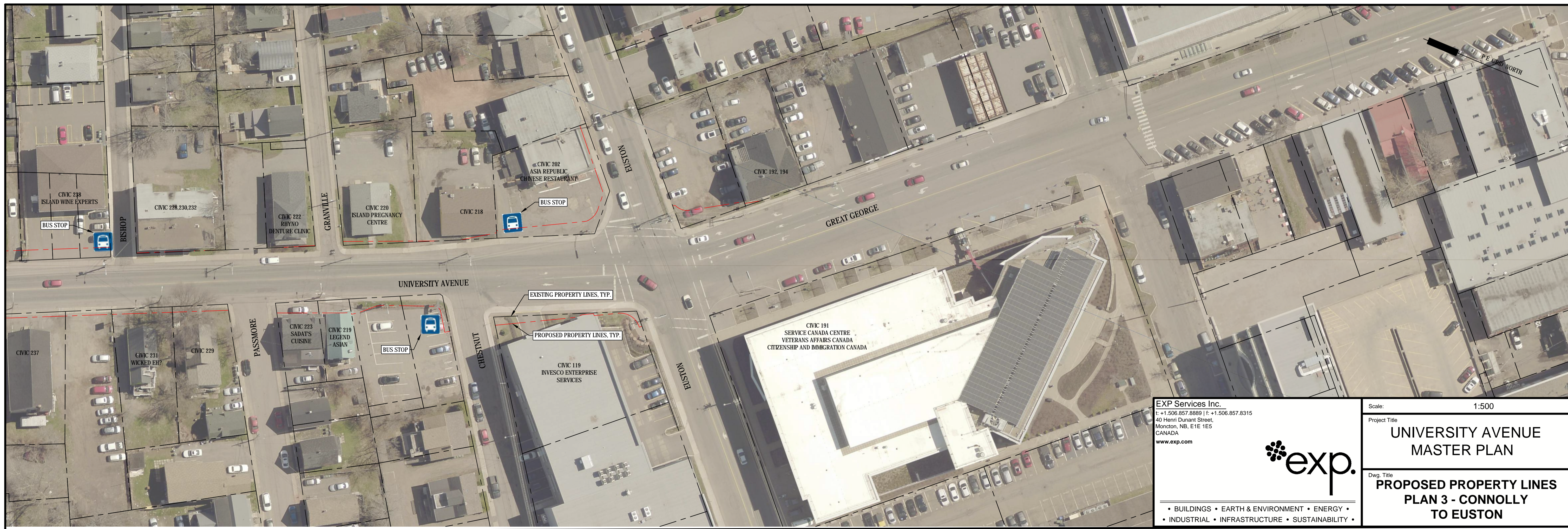
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Dwg. Title
**PROPOSED PROPERTY LINES
 PLAN 3 - CONNOLLY
 TO EUSTON**

Appendix 7 –
Renderings of University Avenue













